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ANNOUNCEMENT OF THE TWENTY-FOURTH SUMMER SESSION JULY 6—AUGUST 13 1915

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This announcement is intended to give detailed information to prospective students in the Summer Session of Cornell University.

For general information concerning the University and the work in its various colleges during the academic year, the requirements for admission, etc., the General Circular of Information should be consulted. This and the other Official Publications of Cornell University are listed on the last page of the cover of this pamphlet. Any one of the informational publications there mentioned will be sent gratis and post-free on application to the Secretary of Cornell University, Ithaca, New York.

CALENDAR

SUMMER SESSION 1915

In order to get the full number of exercises announced for the Summer Session, it is necessary that all work begin promptly on Tuesday morning, July 6. Students are, therefore, urged to reach Ithaca in time to be present at the first exercise in each class. If possible, they should register on Monday, July 5; if not, they should register on Tuesday during the hours not occupied in class work.

Classes which meet five times per week will meet on Saturday, July 10, but on no other Saturday.

July 5, Monday,	**1 to 5 p. m. Registration at office of Registrar.**
July 6, Tuesday,	**Instruction begins at times and places announced under each course. Registration continued.**
July 6, Tuesday evening, and following Tuesdays,	**Musical Recital, Sage Chapel.**
July 8, Thursday evening, and following Thursdays,	**Musical Recital, Bailey Hall.**
July 10, Saturday before 1 p. m.	**Last day for payment of fees at the Treasurer's Office, 1 Morrill Hall.**
July 12, Monday evening,	**First lecture in Monday evening course. Continued on following Mondays. Rockefeller Hall.**
July 14, Wednesday evening, and following Wednesdays.	**Departmental Conferences.**
August 12, 13, Thursday and Friday,	**New York State Examinations for Teachers' Certificates.**
August 13, Friday,	**Summer Session closes.**

DAILY NEWSPAPER

The Cornell Daily Sun, the regular daily paper through the University year, is issued during the Summer Session each week day morning. This contains the official weekly calendar of all University events, and official notices of interest to students. The full registration list will be printed in the early numbers. The paper will give full reports of all lectures of general interest and of other matters in the University community.

CORNELL UNIVERSITY, SUMMER SESSION 1915

OFFICERS

Jacob Gould Schurman, LL.D., President of the University.
George Prentice Bristol, A.M., Director of the Summer Session.
David Fletcher Hoy, M.S., Registrar of the University.

STAFF OF INSTRUCTION

Arthur Augustus Allen, Ph.D., Instructor in Zoology. — Zoology
Ross Peter Anderson, Ph.D., Assistant Professor in Chemistry. — Chemistry
Elmer James Bailey, Ph.D., Instructor in English. — English
Dane Lewis Baldwin, M.A., Instructor in English. — English
Darwin L. Bardwell, D.Sc., Assistant Superintendent of Schools, New York. — Education
Ernest Blaker, Ph.D., Assistant Professor of Physics. — Physics
Roy G. Blakey, Ph.D., Assistant Professor of Economics. — Economics
Albert William Boesche, Ph.D., Assistant Professor of German. — German
Edmund Garrigues Boring, Ph.D., Instructor in Psychology. — Psychology
Julian Pleasant Bretz, Ph.D., Professor of American History. — History and Government
George Prentice Bristol, A.M., Professor of Greek. — Greek
Leslie Nathan Broughton, Ph.D., Instructor in English. — English
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Laura Bryant, Director of Music, Ithaca Public Schools. — Music
William Benjamin Buck, Assistant in Wood Shop. — Manual Training
Earle Nelson Burrows, C.E., Instructor in Civil Engineering. — Engineering
Walter Butterfield, Director of Music, Manchester, N. H. — Music
Robert Wilbur Burgess, Ph.D., Instructor in Mathematics. — Mathematics
Frank Carney, Ph.D., Professor of Geography and Geology, Denison University. — Geography
Walter Buckingham Carver, Ph.D., Assistant Professor of Mathematics. — Mathematics
Emile Monnin Chamot, Ph.D., Professor of Sanitary Chemistry and Toxicology. — Chemistry and Toxicology
Hamlin E. Cogswell, Mus.M., Director Normal Conservatory of Music, Indiana, Pa. — Music
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Hollis Dann, Mus.D., Professor of Music. — Music
Hermann Davidsen, Ph.D., Assistant Professor of German. — German
John DeWitt Denney, A.B., Assistant in Zoology. — Zoology
Forrest L. Dimmick, A.B., Assistant in Psychology. — Psychology
Ruth Laura Dimmick, A.B., Assistant in Education. — Education
Alexander M. Drummond, A.M., Instructor in Public Speaking. — Public Speaking
Charles Love Durham, Ph.D., Professor of Latin. — Latin
Harold Walter Elley, M.A., Assistant in Chemistry. — Chemistry
Ellsworth David Elston, A.B., Instructor in Physical Geography. — Physical Geography
Carl John Engelder, A.B., Assistant in Chemistry. — Chemistry
William Silliman Foster, Ph.D., Instructor in Psychology. — Psychology
David Kennedy Fraser, M.A., Assistant Professor of Education. — Education
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Roswell Clifton Gibbs, Ph.D., Assistant Professor of Physics. — Physics
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Pierre F. Giroud, L.L., O.I., Lecturer in University of Pa. — French
J. Earl Griffith, Head of Department of Drawing and Art, Central High School, Newark, N. J. — Drawing and Art

John Walter Hall, Teacher of Singing, New York City. Music
Clarence Walter Ham, M.E., Assistant Professor of Machine Design. Industrial Education
William H. Hoerrner, Professor of Music, Colgate University, Hamilton, N. Y. Music
Joseph Stanley Hook, A.M., Instructor in Economic Geology. Geology
Leroy Hooper, Foreman of Pattern Shop. Manual Training
Helen B. Hoover, Teacher of Applied Art, West Technical High School, Cleveland, Ohio. Industrial Education
Wallie Abraham Hurwitz, Ph.D., Assistant Professor of Mathematics. Mathematics
Arthur Edward Johnstone, Teacher of Music, New York City. Music
John Joseph Kennedy, B.Chemistry, Assistant in Chemistry. Chemistry
Ralph Hayward Keniston, Ph.D., Assistant Professor of Romance Languages and Literatures. Spanish
Dexter Simpson Kimball, M.E., Professor of Machine Design and Industrial Engineering. Industrial Education
Burton Judson Lemon, Ph.D., Instructor in Chemistry. Chemistry
Gustav Ernst Lundell, Ph.D., Assistant Professor of Chemistry. Chemistry
William Edward Lunt, Ph.D., Professor of Modern European History. European History
Joseph Vance McKelvey, Ph.D., Instructor in Mathematics. Mathematics
Samuel Arthur Mahood, M.A., Instructor in Chemistry. Chemistry
James Frederick Mason, Ph.D., Professor of Romance Languages. French
Edith H. Matzke, M.D., Medical Adviser for Women. Hygiene
Irving E. Miller, Ph.D., Assistant Professor of Philosophy, University of Rochester. Philosophy
Daniel Chauncey McCoy, Assistant in Chemistry. Chemistry
Victor Elvert Monnett, A.B., Instructor in Geology. Geology
Frederick Monteser, Ph.D., Head of the Department of German, DeWitt Clinton High School, New York City. German
Guy Brooks Muchmore, A.B., Assistant Professor of Public Speaking. Public Speaking
William Ridgley Orndorff, Ph.D., Professor of Organic and Physiological Chemistry. Chemistry
Oliver Ralph Overman, A.M., Assistant in Chemistry. Chemistry
Frederick William Owens, Ph.D., Instructor in Mathematics. Mathematics
Miles Albion Pond, Ph.B., Assistant Professor of Civil Engineering. Descriptive Geometry
Paul Russel Pope, Ph.D., Assistant Professor of German. German
Carlton Elderkin Power, B.S., Instructor in Physics. Physics
Laurence Pumpelly, Ph.D., Assistant Professor of the Romance Languages and Literatures. French
James T. Quarles, A.A.G.O., University Organist. Music
Harry Westfall Redfield, Ph.D., Instructor in Chemistry. Chemistry
Hugh Daniel Reed, Ph.D., Assistant Professor of Neurology and Vertebrate Zoology. Zoology
Ernest William Rettger, Ph.D., Assistant Professor of Applied Mechanics. Mechanics
Floyd Karker Richtmyer, Ph.D., Assistant Professor of Physics. Physics
Ethel Roberts, Certificated Teacher of the London County Council, London, England. Physical Education
Martin Wright Sampson, M.A., Professor of English. English
Burton T. Scales, M.A., Director of Music, Girard College, Philadelphia, Pa. Music
Francis Joseph Seery, B.M.S., Assistant Professor of Civil Engineering. Hydraulics
Francis Robert Sharpe, Ph.D., Assistant Professor of Mathematics. Mathematics
John Sandford Shearer, Ph.D., Professor of Physics. Physics
Henry Augustus Sill, Ph.D., Professor of Ancient History. History

Louis Lazarus Silverman, Ph.D., Instructor in Mathematics. Mathematics
Joseph Slepian, Ph.D., Instructor in Mathematics. Mathematics
Virgil Snyder, Ph.D., Professor of Mathematics. Mathematics
Stella Stark, Director of Music, State Normal School, Buffalo, N. Y. Music
Sheila Sutherland, Certificated Teacher of the Royal Albert Hall School of Physical Education, London, England. Physical Education
John Roscoe Turner, Ph.D., Assistant Professor of Economics. Economics
Elizabeth Undritz, A.M. German
Leonard Church Urquhart, C.E., Instructor in Civil Engineering. Engineering
James Elijah Vanderhoef, Foreman in Foundry. Manual Training
Herbert H. Vaughan, Ph.D., Instructor in Romance Languages, University of Pennsylvania. Spanish
Oscar Diedrich von Engeln, Ph.D., Assistant Professor of Physical Geography. Geography
Albert Edward Wells, Assistant Professor of Machine Construction. Industrial Education
Thomas Whitney Benson Welsh, Ph.D., Instructor in Chemistry. Chemistry
Bernice White, Instructor in Music in the Normal College, New York City. Music
Harry Elmsley Wood, Director of Manual Training, Indianapolis, Ind. Industrial Education
William K. Wright, Ph.D., Instructor in Philosophy. Philosophy
Wesley Daniel Zinnecker, Ph.D., Instructor in German. German

The members of the Faculty of the College of Agriculture giving instruction in the Summer Session are listed on page 57.

OBJECT OF THE SUMMER SESSION

The primary object of the Summer Session is to advance education by helping those engaged in it. The instruction is adapted to the needs of the following classes:

1. Professors and teachers in colleges and schools, superintendents, and supervisors of special branches of instruction.

The announcements of the different departments show a wide range of work. This work is either advanced and, therefore, suited for specialists who wish to pursue their individual study, or more elementary and adapted to teachers who desire to start in a new field. In addition to the instruction of the class room, the University's libraries, laboratories, and shops are open for use. For superintendents and supervisors, there are also courses in administration, and in general and special methods, besides lectures on educational philosophy and theory.

2. College students in Cornell or other universities who wish to use some of the "long vacation". In the case of graduates some of the work offered may be counted toward an advanced degree. Undergraduates may anticipate work and thereby shorten their course, or may make up existing deficiencies. The conditions for receiving credit, and the amount which may be obtained, are stated on pages 7 and 8.

3. Students entering the University and wishing to obtain surplus credit at entrance, or to complete the entrance requirements. It often happens that students have in June more or less than the requirements for admission to college. The Summer Session affords them the opportunity either to add to their surplus and thus, in some cases, to gain a year in time; or to make up their deficiency.

4. All persons qualified to pursue with profit any course given, whether or not they are engaged in study or teaching.

STATISTICS OF ATTENDANCE, 1914

The whole number enrolled in the Summer Session of 1914 was 1436 (743 men and 693 women), representing 40 states and territories and 25 foreign countries. Of this number 510 were students during the previous winter; 602 were persons engaged in teaching, of whom 38 were teachers in colleges, 13 in normal schools, 166 in high schools, 255 in grammar schools, 11 in private schools, and 97 were supervisors or superintendents.

ADMISSION, ATTENDANCE, REGISTRATION

There is no examination for admission to the Summer Session. Each person must, however, satisfy the instructor in charge of any course (unless it be elementary) that he is qualified to pursue the work. Any duly registered student of the Summer Session may visit such classes as he desires. **Admission to the class rooms is restricted to duly registered students.** Persons wishing to have work done during the Summer Session counted towards a degree, must conform to the regulations stated under the heading "Credit for Work," page 7.

All students are required to register at the office of the Registrar in Morrill Hall. They may register on Monday, July 5th, between 1 p. m. and 5 p. m., or upon the day of their arrival, if they reach Ithaca later than July 5th. Registration on July 5th is urged. Class exercises begin at 8 a. m., Tuesday, July 6th. The Registrar's office is open from 9 a. m. to 4 p. m. every day except Saturday, when it is closed at noon. Open Monday, July 5, 1–5 p. m.

TUITION FEE

The single tuition fee, with the exceptions noted below, for the entire Summer Session, whether one course or more be taken, is $30. This must be paid at the office of the Treasurer, Room 1, Morrill Hall, within five days after registration day. In case of withdrawal, within five days from the first registration day, for reasons satisfactory to the Treasurer and the Registrar, the tuition paid may be refunded and the charge cancelled. In case of withdrawal within two weeks after the first registration day, one-half the tuition may be refunded. In case of registration after the first three weeks of the session, students must pay two-thirds of the full tuition fee. No student is admitted without the payment of this fee. Sibley College students taking shop work are not exempted. Admission to classes is restricted to duly registered students.

For instruction in swimming and fencing an extra fee is charged. See p. 15.

Tuition in all subjects taught in the College of Agriculture, is provided by the State of New York and is free to *residents of this State.* For all others the charge is the same as for other work, $30. Free tuition does not include any instruction outside the College of Agriculture, nor are students receiving free tuition permitted to attend classes outside the College of Agriculture.

LABORATORY FEES

Chemistry. A fee is charged for material actually consumed, and such deposit must be made with the Treasurer as the instructor may prescribe.

Physics. In this department the fee is at the rate of $1 for every five hours a week of work in the laboratory. The entire amount must be paid to the Treasurer at the beginning of the session.

Geography and Geology. In courses B and D in geography a fee of $1 each must be paid in advance to the Treasurer to cover incidental expenses of the course.

Shopwork. The fee for shopwork is at the rate of $1.50 for every fifty hours spent in the shops. This must be paid in advance to the Treasurer. Students registered in Sibley College during the previous year are not required to pay this fee.

Zoology. See courses under Zoology, page 53.

Library Deposit. See under Library, page 10.

ACADEMIC CREDIT FOR WORK

In the College of Arts and Sciences. The requirements for the degree of Bachelor of Arts are residence for eight terms (four years), and the completion

of one hundred twenty hours ("points") of elective work. A student who has satisfied the entrance requirements of the College, and has afterward completed in two or more Summer Sessions at least twelve hours of work in courses approved by the departments concerned, may be regarded as having thus satisfied one term of residence. Under no circumstances shall work done in Summer Sessions be accepted as the equivalent of more than two terms of residence. The maximum amount of credit towards the A.B. degree which is allowed for the work of any one Summer Session is seven hours.

In Other Colleges of the University. The nature and amount of credit allowed in these for Summer Session work may be learned from the statements under the announcement of each course.

In the Graduate School. Graduate work at Cornell is not expressed in terms of courses or hours. A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may be admitted to candidacy for an advanced degree upon the recommendation of the professors under whom he proposes to work. The conferring of the degree itself does not depend primarily on the completion of any prescribed number of courses or of a fixed term of residence. It involves the writing of a thesis and the passing of a special final examination. The minimum period of residence for the Master's degree is one academic year or its equivalent, and for the Doctor's degree three years.

Not all work done by a graduate student is graduate work in the strict sense of the term. Graduate work to be considered as work for a degree must be of advanced character in some field or department of knowledge.

The residence requirements for the degree of Master of Arts may be fulfilled in whole or in part by attendance during the Summer Session of the University. For this purpose, two Summer Sessions will be regarded as the equivalent of one term and four Summer Sessions as the equivalent of one year. Candidates for this degree who are in residence during Summer Sessions only are also required to continue their studies during the year under the direction of the chairman of the special committee in charge of their work.

The graduate work offered in the summer of 1915 may be learned from the departmental announcements. Not all departments offer graduate work.

Any person wishing to become a candidate for an advanced degree and to study during the Summer Session should write to the professor whose work he expects to take, and also to the Dean of the Graduate School, asking for a blank form of application for admission to the Graduate School. It is much better to make these arrangements before coming to Ithaca, thus avoiding delay and interruption of study after the Summer Session has begun.

Certificates for Work Done. Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 13, and the applicant must leave at the office of the Registrar a large sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

The Department of Education of New York City will, in certain subjects, accept these certificates instead of requiring examinations for licenses.

COST OF LIVING

The cost of board and furnished room in Ithaca during the Summer Session runs from $6 a week upwards. In some cases the cost has been reduced to $5 but it is not safe to count upon less than this sum.

The price of a single furnished room may be as low as $1.50 a week. The prices advance with the size and location of the rooms.

Rooms are engaged with the understanding that they will be occupied for the entire session, unless otherwise agreed upon by both parties. Table board is usually engaged by the week, or if so stated, by the day.

The price of table board runs from $4.50 to $6 in boarding houses. In cafeterias and restaurants, the average cost of meals would amount to about the same sum.

RESIDENTIAL HALLS—ROOMS—BOARD

1. **For Women.** The University has two residential halls for women in which board and rooms may be obtained during the Summer Session, by registered students only.

Rooms in these buildings will be reserved in the order of application. Each application for a room must be accompanied by a deposit of $5.00 or it will not be entered. The amount of the deposit will be deducted from the bill for accommodations during the Summer Session. It may be refunded if the applicant shall give formal notification to the manager, not later than June 15th, of withdrawal of her application.

In Sage College which accommodates 175, the charge for room, table board, and a specified amount of laundry will be for the session from $48 to $60 according to the size and location of the room.

In Prudence Risley Hall, with rooms for 144, the charge for the same will be from $54 to $57 according to the room occupied.

In both buildings this charge includes luncheon on Saturday, July 3, lodging Saturday night (not earlier), and all meals to and including dinner Saturday, August 14.

In both of these buildings members of the Summer Session may obtain table board if desired.

2. **For Men.** For men there is available this summer the south side of Cascadilla Hall. In this a furnished room may be had for the six weeks of the Summer Session at a cost of $10 to $15. The University maintains an excellent cafeteria restaurant in the Home Economics building where meals may be had at reasonable charges.

For room plans and all information relative to these halls, apply to Thomas Tree, Manager of Residential Halls, Sage College, Ithaca, N. Y.

THE LIBRARIES

The University Library is open on week days from 9 a. m. to 10 p. m., except Saturday, when it closes at 1 p. m. In this are located the main library, containing about four hundred thousand volumes, and most of the seminary and special libraries. The main reading room affords accommodations for over two hundred readers, and contains a selected library of over 8,000 volumes of reference works. Adjacent to it is the periodical room in which are kept the current numbers of about five hundred journals in various fields of knowledge. These rooms are

open to all students. Students properly qualified are allowed the use of the seminary rooms and of the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, allowed to a limited extent to take out books for home use. Persons wishing this privilege must make a deposit of $5, which will be refunded upon the return of all books taken out. Special libraries of chemistry, in Morse Hall, and of anatomy and physiology, in Stimson Hall, are open to students in these departments.

The Library of the College of Agriculture, in the basement of the Agronomy building, is open on week days from 9 a. m. to 5 p. m., except Saturday, when it closes at 1 p. m. In it will be found a large collection of bulletins and reports of experiment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, in the Department of Entomology on the fourth floor of the main building, is one of the most complete of its kind in the United States. Nearly all the departments in which instruction is given have well-selected departmental libraries.

LECTURES, MUSICAL RECITALS, EXCURSIONS

In addition to the regular class room work there will be public lectures on Monday and Friday evenings. These will include three lectures on some topic in English literature by Dr. HOMER B. SPRAGUE, two on Dante, and one each on Venice, Florence and Rome.

There are also lectures of general interest each week in connection with the various departments. Notice of these will be given in the University Calendar.

Musical recitals will be given on Tuesday and Thursday evenings alternately in the Sage Chapel and Bailey Hall.

Wednesday evenings are devoted to the departmental conferences which are open to all interested. Notice of these will be given from week to week.

In connection with the work of several departments excursions are made to many points of interest. Some of these are open to members of the Summer Session. Notable for their attraction are the excursions to Watkins Glen and to Niagara Falls.

RAILROAD ROUTES AND RATES

Ithaca is reached by either the Lehigh Valley or the Lackawanna railroad. By the latter, a branch leaves the main line at Owego. Through trains run from New York and Buffalo on the Lehigh, and through sleeping cars run daily from New York on both roads. From Philadelphia, and from Baltimore, Washington, and the South via the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh at Bethlehem. On the Lehigh, through trains for Ithaca connect with the New York Central at Auburn, and with the Pennsylvania (Northern Central) and the Erie at Elmira.

From some important points in the Middle and Atlantic Coast States summer excursion tickets may be purchased to Ithaca. From central and western states it is generally possible to buy excursion tickets to Niagara Falls, in case an excursion rate to Ithaca is not available.

Persons interested should, some time in advance of their departure, make inquiry of the railroad agent at their home town. If full information cannot be obtained in this way, write to the Director of the Summer Session, Ithaca, New York.

COURSES OF INSTRUCTION

Most of the courses offered consist of five exercises a week, each week day except Saturday. The number of actual hours of class work in any course may be found by multiplying the number of weekly exercises by six.

The word "hour" used in speaking of University credit means the equivalent of one class exercise a week for a half year or one semester. One hundred and twenty such "hours" are required of candidates for the A.B. degree.

(G. S. = Goldwin Smith Hall.)

EDUCATION

Courses A, B, and C, will be found especially helpful to college graduates who are preparing for examinations in professional subjects as outlined in the New York State Syllabus and Course of Study for the renewal of the College Graduate Certificate Limited. The State Education Department will hold an official examination for such candidates at Ithaca, August 12 and 13. Since it is permissible to do so, those who can should prepare for examination in two subjects this summer and for the remaining two a year later.

A. **Principles of Education.** Lectures, discussions, and textbook study. Superintendent BARDWELL. Daily except Sat., 11. G. S. 142. Credit, two hours.

This course is designed to be an introduction to the general theory of education. The topics discussed will group themselves about three main considerations.

First. Education as an agency for securing individual and social progress.

Second. The school studies, their value and their organization into curricula for cultural and vocational needs.

Third. Scientific methods of teaching these subjects.

The following are some of the leading topics which will be considered: the relation between education and democracy; home life; social adjustment; individual and social progress; the social and individual basis of education; basis for selection of studies; the organization of curricula; the peculiar problems of the secondary school pupil; the organization of schools to meet these problems; aims of teaching in secondary schools; readjustments and relations between pupils and teachers; plans of studies and of courses; adaptations to needs of various classes of pupils; training of teachers; comparison of work of teachers and pupils by teachers and by supervisors; moral and religious training; social training; English and its coördination with other subjects of the curriculum; school libraries; the peculiar problem of the recitation; vocational guidance and education.

Among textbooks which will be especially useful are: High School Education and The Modern High School, by Johnston and others; Principles of Secondary Education, by DeGarmo, Volumes I, II, and III; The Educative Process, by Bagley; The Teaching Problems, by Strayer; Habit Formation, by Rowe.

B. **History of Education.** Lectures, discussions, textbooks, and prescribed readings. Assistant Professor MILLER. Daily except Sat., 9. G. S. 256. Credit, two hours.

This is a course in the interpretation of current educational aims, ideals, and practices through a study of their evolution in the history of civilization. Emphasis will be placed upon those social, political, and culture movements that have been significant for education, and conversely the contributions of education to social progress will be pointed out. Special topics for extended treatment will be selected from among the following: the fundamental elements of education as seen in primitive life; the educational ideals and practices of the Greeks, with their bearing on modern questions of physical education, liberal vs. vocational education, and the social service of the expert; the contest between scholasticism and humanism, with the elements which these two movements have contributed to the problems of current education; the progress of realism and of science in education; education according to nature and the contributions of the child-study movement from Rousseau to Montessori; the development of educational theory, particularly in its effect on methods of instruction—the psychological movement as represented in Pestalozzi, Herbart, Froebel, Parker, Dewey, etc.; the evolution of the public school from the time of the Greeks and the Hebrews to the development of the Great European and American state systems of education; current social and vocational movements. Recommended textbooks: (1) General: Monroe, Graves, Davidson, Kemp. (2) Biographical: Graves's "Great Educators of Three Centuries"; Quick's "Educational Reformers"; Monroe's "Educational Ideal"; and monographs on great educators, such as Davidson's "Aristotle"; Monroe's "Comenius"; Hinsdale's "Horace Mann"; etc.; (3) Educational classics, such as Plato's "Republic"; Pestalozzi's "Leonard and Gertrude"; Spencer's "Education"; Dewey's "School and Society"; etc.; (4) Outlines, bibliographies, source books, books on special periods and particular countries, etc.

C. **Educational Psychology.** Lectures, discussions, and readings. Assistant Professor FRASER. Daily except Sat., 10. G. S. 256. University credit, two hours.

The lectures present a system of functional psychology as applied to education with particular reference to such topics as nervous plasticity, habit, attention and interest, instinctive response, the nature of educational training and discipline, association, perception, observation, memory, imagination, conception, judgment and reasoning. Where feasible, psychological experiments that apply to the work in hand are described or performed. Students will need for class room use Whipple's Questions in General and Educational Psychology (Cornell Study Bulletins for Teachers, No. 3, C. W. Bardeen, Syracuse, N. Y.), and will find it advisable for outside reading to purchase James's Talks to Teachers on Psychology, Henry Holt & Co., and Kirkpatrick's Fundamentals of Child Study, The Macmillan Co. Students who have had no previous work in psychology are advised to take Psychology course A also.

[D. **School Hygiene.** Lectures, discussions, and readings. University credit, two hours. Not given in 1915.

This course is designed to afford immediate practical assistance to all teachers, to enable them to secure and maintain hygienic conditions of instruction and to coöperate intelligently in the vitally important movement for the conservation of public health. The course has also been designed to supply superintendents with a program of work which they may follow in extending a knowledge of school hygiene among their own teachers. Attention will be paid to the school-

house site and grounds, the form and size of the schoolroom, illumination, heating and ventilating, sanitation, school desks, the hearing and vision of school children, the hygiene of the mouth, throat, and nose, the hygiene of reading and of writing, school diseases and accidents, sex hygiene, fatigue and overpressure, and the nature, value, and methods of medical inspection. The work will be illustrated by numerous demonstrations and opportunity will be given for practice in conducting special tests of the sense-organs. Students will need for classroom use Whipple's Questions in School Hygiene (Cornell Study Bulletins for Teachers, No. 4, C. W. Bardeen, Syracuse, N. Y.).]

E. **Mental and Physical Tests of School Children.** Laboratory exercises, lectures, readings, and discussions. Assistant Professor FRASER and Miss DIMMICK. Daily except Sat., 2–4.30. G. S. 248. Credit, two hours.

This work is planned to familiarize teachers and superintendents with the purposes, methods, and results of conducting mental and physical tests, and is particularly recommended to those interested in special classes for defectives, backward, or talented children. It affords practice in the use of the recently developed scales for measuring performance in arithmetic, writing, and English composition, also in the use of the Binet-Simon diagnostic tests of intelligence, of Healy's tests for mental classification, and of numerous other scientific measurements of efficiency, e. g., tests of vision, hearing, strength, endurance, range of attention, suggestibility, inventiveness, ability to learn, to report, etc. Some acquaintance with general psychology is presupposed. The work is based on Whipple's Manual of Mental and Physical Tests.

Approximately the first half of the course will be devoted to drill work for the purpose of acquiring familiarity with the technique of mental tests and with statistical methods of handling data. In the second half of the course the chief emphasis will be laid upon the use of diagnostic tests of mental status, and here the laboratory exercises will be supplemented by special lectures upon the problem of testing and classifying feeble-minded and backward children. Competent advanced students may, however, arrange to prosecute special lines of inquiry in place of the work with diagnostic tests.

F. **Elementary Education.** Daily except Sat., 8. G. S. 256. Assistant Professor MILLER. Credit, two hours.

This course will take up those phases of current educational aims, ideals, and practices which are most significant for elementary school teachers in service. It will assume some familiarity with general psychology and with schoolroom practice. However, those points in psychology and child study that are most influential in determining changes in methods and reconstructions of curriculum will be studied in detail. Particular emphasis will be placed upon the nature, use, and training of the higher thought processes of children in the middle and upper grades—the problems of learning, studying, and thinking. There will be a rapid survey of the most important recent contributions to the literature of teaching the various special subjects of the curriculum. The contributions of experiment, scientific statistics, special investigations of social conditions and vocational outlook of children, etc., will be taken up in their bearing upon the function of the teacher and the school. Those who register for this course should expect to make it the clearing house for rather wide reading of the most recent literature bearing upon the problems with which each is most vitally concerned in his line of

work. The work will, in the nature of the case, require many special references. For general reference, much use will be made of books like the following: Principles of Education, by Bolton, Ruediger, Henderson, respectively; Strayer, A Brief Course in the Teaching Process; Charter's Methods of Teaching; the Riverside Educational Monographs; Dewey's How We Think; Miller's Psychology of Thinking; McMurry's How to Study, etc.

G. **School Administration.** Lectures, discussions, and textbook study. Daily except Sat., 9. G. S. 142. Superintendent BARDWELL.

This course will give a survey of the problems of education from the standpoint of their administration. It is particularly designed for superintendents, principals, supervisory officers, and for mature teachers who are especially interested in problems of administration. Among the problems to be discussed are:

The management of graded schools, and graded school systems and the fundamental principles involved; the relation between state authority and local authority; the mutual relations existing between the board of education, the superintendent of schools, the principal, and the teachers, the pupils, the parents, and the community; the equipment; the training of teachers; the study of methods and devices to ascertain, if possible, the guiding principle; the relation of the school to the community and to its industries; vocational teaching and guidance; the organization and the care of special classes, such as those for backward children, and for defectives; vocational and trade schools.

H. **Industrial Education.** Lectures on the Problems of Industrial Education by Professors MILLER, KIMBALL, and others. Daily except Sat., 12. G. S. 142. For full statement of this course see page 17.

K. **Hygiene.** Lectures and personal conferences. Daily at hours to be arranged. Dr. MATZKE, Medical Adviser of Women, Cornell University.

A number of lectures will be given in Stimson Hall. These are open to all students in the Summer Session. Individual appointments will be made for consultation and examination at the office of the Medical Adviser in Sage College. These consultations are open to all women teachers registered in the Summer Session. Both lectures and individual appointments are required of teachers taking course 2 in Physical Education. (Course 2 in Physical Education is an advanced course for teachers of the subject.)

L. **Physical Education for Women.** Daily by appointment. Sage College Gymnasium. Misses SUTHERLAND and ROBERTS.

I. Open to students attending the Physical Culture classes for the first time.

1. Education of the Rhythmic Sense by means of physical movements.
2. Aesthetic Movements and simple dancing steps.
3. Children's Singing Games.
4. Folk dancing. Daily except Saturday; hours to be arranged. Miss SUTHERLAND, Miss ROBERTS.

II. Open to students who completed course 1 at the 1914 Session, and to special students in Physical Education who devote their entire time to this work, and are thereby enabled to take courses A and B simultaneously. Teachers who complete course 2 are qualified to teach physical culture in the public schools. Credit, two hours. Students in course 2 must take the lectures in Hygiene, as described above under course K.

1. Rhythmic Movements and their application to the teaching of Music and Folk Dancing.
2. Aesthetic Movements and Dance Steps.
3. Children's Singing Games.
4. Folk Dancing, (a) Old English, (b) National, (c) Court.
5. Methods of teaching and arrangement of lessons of course A.

M. **Physical Education—Swimming and Fencing.**

Instruction in swimming and life saving, and fencing for individual training and for teaching, will be given at hours to be arranged for each applicant by appointment.

For this instruction a special charge is made: for swimming, $10; for fencing, $5, including outfit.

Gymnasium costume, and slippers (without heels) will be advisable for fencing.

For women, Sage College Gymnasium. 10–12 a. m., 3–6 p. m. For men, Armory Gymnasium, by appointment. Mr. GELAS.

N. **Rural Education.** Nature-Study. School Gardens. Agriculture. See courses on pages 5-9 and following.

DEPARTMENT COURSES FOR TEACHERS

In addition to the courses described above there are in the various departments courses arranged specially for teachers. They are described under the announcement of each department. All the work of the Session is arranged primarily to meet the problems of teachers and even in the elementary courses, in foreign languages, for example, selection and presentation of subject matter receive attention and illustration.

INDUSTRIAL EDUCATION

Manual Training, Trade Instruction, Drawing, and Handicraft

The subject of industrial education is broader than is generally assumed. It means more than the mere teaching of shop work and drawing. It suggests a scheme of education which will make it worth while for all children to remain in school, and which will provide for the children of the masses and for those who enter the great manufacturing and constructive industries something equivalent to what the state is doing for those who enter the professional and managing activities of the country.

We are all aware that many boys and girls do not have opportunity to enter employments that contribute to their development in any sense of the word, either physically, morally, or intellectually, but drift about from one unskilled occupation to another, gaining little or nothing in efficiency.

It is believed that the right sort of handwork and drawing, combined with the proper treatment of book work, will give these children the proper training to prepare them to enter some branch of actual industrial work.

Many manual-training teachers are taking this broader view of their work and its relation to the other school work, and are endeavoring to fit themselves for the field of industrial education. Some of these teachers are weak on the technical side; others fail to grasp the pedagogical phase of the work.

The growth of industrial education is significant. The program of every institute, convention, and association of school men now gives a prominent place to the subject. Legislative action in reference to industrial and agricultural education is under discussion in nearly every state in the Union. A great national movement along lines of education for efficiency is under way. Manual training, cooking, sewing, drawing, etc., have become more than subjects within a school curriculum; they are a part of a new system of education.

For such reasons the University offers in the Summer Session strong courses in education, handwork, and drawing.

Equipment. The shops and drawing rooms of Sibley College are among the largest and best equipped in the country. They are being used regularly by 1200 students and can accommodate 1500. They are at the disposal of the students of the Summer Session, who have the further advantage of seeing the regular instruction given to Sibley College students. They include a machine shop, a foundry, a blacksmith shop, a woodworking shop, and many drawing rooms, lecture rooms, etc. The shops are exceptionally well supplied with machines and tools for complete instruction in the various subjects.

A portion of the equipment has been rearranged and adapted for the special needs of teachers of manual training, drawing, and arts and crafts.

Teachers. The faculty of this department is made up as follows: 1. Teachers of shop work and drawing selected from the regular faculty of Sibley College. Every one of these men is a trained specialist and an experienced teacher. 2. Teachers of handicraft and drawing selected from the teaching corps in cities noted for their excellent handicraft work. 3. Professors in the University who will adapt their usual presentation of subject matter to the needs of teachers in schools of manual training and industrial education. 4. Lecturers on the various subjects concerned, giving complete treatment of the problem of handwork in the public schools. Each of these men is a recognized authority in his special field.

Admission. The courses are open to men and women, and will meet the needs of: (a) teachers and supervisors of industrial arts, handwork, and drawing who wish to perfect themselves in technical skill and professional study; (b) men or women who have teaching experience, or who possess technical ability and wish to qualify as teachers of these subjects; (c) teachers in the State of New York who wish to qualify for the state examination in drawing and manual training as outlined by the State Department of Education; (d) school superintendents, principals of schools, and teachers who wish, through the lectures and conferences, to acquaint themselves with the methods and practices of industrial education.

Daily Program. The shops and drawing rooms are open daily (until noon on Saturday). The lectures for this department are given between the hours of 12 and 1 every day except Saturday. Conferences will be held during the Session on Wednesday evenings. The University Library is available for reading and original work by students who desire to examine the books, pamphlets, and reports referred to in the lectures and conferences.

Courses of Study. It is believed that some knowledge of the principles of education, a definite understanding of tool processes, and the ability to express ideas adequately through the art of drawing are the professional qualifications which make for efficient teaching of subject matter coming under the head of

industrial education. With this aim in view this department offers three definite courses of instruction. 1. Education; 2. Handwork; 3. Drawing.

I. Education

1. **Problems of Industrial Education.** Lectures and conferences. Daily except Sat., 12–1. G. S. 142. Professors MILLER, KIMBALL, and others.

A discussion of the development of industry and the rise of manufacturing methods, with particular reference to the effect of the same on education. Manufacturing methods have changed so radically and have influenced our educational outlook to such an extent that teachers of all branches of industrial education, and no less all supervising officers, need some knowledge of these matters if they are to attempt to prepare young people for industry. Among the topics treated will be the influence of machinery, in general, upon manufacturing methods, the economic problems of production and the related problems of factory legislation, factory welfare work and industrial education.

In the latter part of the course a few lectures on the practical working out of some of the problems of industrial education will be given by Messrs. Wood and Griffith. These lectures will be illustrated by exhibits of actual school work and by lantern slides.

The making of a local industrial educational survey.

The urgent need for evening trade extension courses and methods to be employed.

The part the manual training teacher is to play in the vocational education movement.

What the Empire State is doing in vocational education.

Four lectures by Arthur D. Dean, Chief of Division of Vocational Schools, New York State Education Department. Mr. Dean will also conduct one or more of the evening conferences.

Evening Conferences. A series of round table conferences held each summer has proved remarkably successful in bringing together in an informal way all persons closely connected with this general field of education. The special problems of each student are taken up and discussed in the light of the combined experiences of all present. These gatherings of students, shop instructors, and lecturers will be continued this year.

Subjects for Conferences

Vocational guidance possibilities.

Prevocational training.

What can the city of five thousand inhabitants offer in vocational education?

Has the voluntary part-time or continuation school seemed locally to be a success?

Is it proper to give vocational training to children between twelve and fourteen?

Do we need a different type of science and mathematical teaching for boys and girls who do not go to college?

Shall these subjects correlate with activity work?

What place has home project work?

Can the vocational or manual training man help forward the movement for vocational education for girls?

II. Handwork

2. **Manual Training for the Lower Grades.** A course of handwork adapted to the first six years of the elementary school. No set course of study in handwork suitable for this grade will be given, but instead the various materials, suitable for elementary handwork will be made use of and the various methods by which problems can be made will be discussed, demonstrated and used. This will enable those taking the course to have a large variety of experiences and will equip them with such first hand information as will make them well fitted to select the type of work best suited to the special communities in which they work. In the lessons on stenciling, for example, instead of giving a problem in stenciling of the general type, there will be discussions, demonstrations and practice in stenciling by the direct method, by the indirect method; with water dyes, with spirit dyes, with water colors, with oil paints, and with crayons; by brush method, by spray method; on paper, textiles, and wall surfaces. There also will be given an opportunity to carry out a definite problem with the processes and material best suited to the individual's needs. Work in stick printing, block printing, construction in paper and cardboard, weaving, reed and raffia work, book binding, blue printing and Vandyke printing, thin wood work, and chair caning will be handled in a similar manner in order that it may meet the particular needs of the regular grade teacher, be of help to the special teacher of art and manual training who wishes to become familiar with the problem of handwork in the elementary grades, or of aid to the craft worker who wishes to broaden his experience. Daily except Sat., 2–4. Mr. Wood.

3. **Wood Work for the Elementary Schools.** This is a course employing a comprehensive set of bench tools adapted to the upper grades of the grammar schools. Each model is considered with reference to form, fitness, and decoration. Methods of presentation and execution. This course is intended to equip a capable but inexperienced person for a position as teacher. Daily, 8–11. Mr. Hooper.

4. **Wood Working for Secondary Schools.** A course which aims to prepare for the teaching of wood work in the secondary schools. It includes the study of joinery, furniture making, structural design, and decoration. Concrete problems involving the principles of the work will be suggested by the teacher and carried out by the class. The individual will have considerable latitude in the choice of the particular project and in its design and decoration. Particular attention will be paid to design. Daily except Sat., 2–5. Mr. Hooper.

5. **Shop Lectures and Conferences.** Lectures and conferences on the organization and supervision of manual training, methods and materials, equipments, costs, and courses of study; also practical talks and demonstrations on subjects of importance to the manual training teacher; such as woods and wood construction, lumber and forestry, wood finishing, etc. T Th, 4–5. Mr. Wood.

6. **Foundry Work for Secondary and Trade Schools.** The course begins with instruction in tempering the sand and making green sand moulds for small work. Following this come exercises in core making, and an explanation of loam work.

Machine, floor, and sweep mouldings are briefly described. Castings are made in cast iron, and the students are taught to operate the cupola furnace. Mr. VANDERHOEF.

7. **Forging for Secondary and Trade Schools.** Systematic instruction in the use of each tool as it is taken up, the study of each material worked, with an explanation of its various grades, the proper method of treatment for each, and the discussion of the methods of making large forgings. The ground covered includes instruction in the building and care of fires, heating, drawing, forming, bending and twisting, upsetting, upsetting while bending, upsetting for square corners, punching, bolt making, welding, including careful instruction in scarfing for the various welds, the making and use of heading tools, chain making, the making and fitting of braces, the construction of hooks and ring bolts, riveting, and the use of threading tools. Training is also given in the use of the power hammer. The work in steel includes drawing, forming, welding, and tempering, and spring and tool making.

This course will not be given unless a sufficient number apply to Professor Kimball on or before July 8th.

8. **Machine Work for Secondary and Trade Schools.** The different measuring tools and devices, with the advantages, methods of use, and limits of accuracy of each are considered. Each cutting tool is taken up, its cutting angles and general adjustments are discussed, together with the feeds and cutting speeds suitable for each material worked and for each machine. The course includes instruction in centering, squaring, straight and taper turning and fitting, outside and inside screw cutting, chucking, reaming, finishing and polishing, drilling, tapping, mandrel making, grinding and lapping, boring, brass turning and finishing, ornamental turning, planing flat and V surfaces, fitting, the use of the milling machine, gear cutting, tool making, including taps, drills, reamers, milling cutters, and cylindrical gauges. Mr. WELLS and Mr. HOWE.

III. Drawing and Art Training

9. **Freehand Drawing for Elementary and Secondary Schools.** A course to meet the needs of the public school teacher. A complete course of study, in detail, from the first grade through high school is first considered. Then each subject of that course is carefully developed and worked out. This will include methods of drawing in such phases of the subject as the teacher must meet and in the common mediums such as pencil, water color, crayon, and charcoal. Theory and practice will be closely correlated. The study of design and color, perspective, and the pose, for their public school value, combined with talks on methods of presenting these subjects receive thorough attention. Sketching from nature, including out-of-door work for characteristic growth of trees, forms a part of the course. The relation of art to hand work is considered and the study of design is made applicable to constructive problems. Daily except Sat., 9–12. University credit, two hours. Sibley 208. Mr. GRIFFITH and Miss HOOVER.

Although the above course forms a complete unit in itself, the following course is desgined as supplementary.

9a. **Design, Fine and Applied Art.** (Open only to students who have completed course nine or its equivalent.) Design is considered from a more

advanced point of view and applied to color problems, book plates, title pages, constructive problems, printing, and the like. Stenciling and block printing on velvets and other textiles together with the introduction of interwoven silk on these textiles will be taught; also leather tooling and coloring of leather. Advanced out-of-door sketching will supplement that started in course nine. Manuscript printing, done direct with quill or lettering pen together with illumination will be considered as outgrowths of the study of printing. Costume design and household decoration, as far as they are applicable to the grammar or the high school, will be considered in their application. Throughout the course illustrated lectures to develop art appreciation will be given. All subjects will be considered from the standpoint of both the secondary and the more advanced schools. A small laboratory fee (not to exceed one or two dollars) will be charged, to cover cost of material furnished. Daily except Sat., 8–11. Sibley 202. University credit, two hours. Mr. GRIFFITH and Miss HOOVER.

Students who have completed courses 9 and 9a may continue study, if so desired.

10. **Mechanical Drawing for Secondary Schools.** This course is designed for those who wish to teach mechanical drawing in secondary schools and for those who feel the need of a more complete knowledge of this subject to assist them in teaching shop work. Some of the topics covered are use of instruments, lettering, orthographic and isometric projection, inking, tracing, conventions, and working drawings. Students familiar with these topics may elect a more advanced course. Sibley 102. Assistant Professor HAM.

PSYCHOLOGY

A. **Introduction to Psychology.** G. S. Room C. Credit, two hours. Lectures: M T W Th, 9. Recitations: F, 9. Dr. FOSTER.

This course furnishes a general introduction to the study of the normal human mind from the experimental point of view. It opens with a brief discussion of the nature of a "scientific" psychology, of the problems which such a psychology is called upon to face, and of the methods at its disposal for their solution. It then sets forth in order the facts and laws of mental life which have been revealed by experiment, beginning with the mental elements, sensation, image, and affection; it passes by way of attention, perception, association, and memory to the highly complex processes of imagination, voluntary action, and thought. Throughout the work use will be made of the unique collection of demonstrational apparatus which composes the equipment of a special laboratory in Goldwin Smith Hall; the beginning student is thus enabled to confirm in his own experience the statements made in the textbook and in the lectures.

Readings will be prescribed in Titchener's Primer of Psychology (Macmillan) and questions based upon the text and lectures will be answered by the student each week in writing. Supplementary readings in Titchener's Textbook of Psychology will be recommended to members of the class who desire to pursue more intensive study.

B. **The Psychology of Memory and Learning.** G. S. 137. Credit, one hour. T Th, 11. Dr. FOSTER.

A brief account of the psychology of memory and allied processes, and of their meaning in common life. The course will begin with the necessary preliminary study of attention, image, and idea. The later lectures will deal in greater detail with the results of the experimental investigation of association, retention, and recall, and will discuss the laws of memory, the explanation and systematic bearing of the facts discovered, and the practical bearing of the facts upon such matters as rules for teaching and learning, menmonic systems, the formation and breaking of habits, recitation, examination, and "cramming." Demonstrations involving the more recent and precise apparatus and technique of the memory-methods will be introduced. Reading will be prescribed in Titchener's Textbook of Psychology, and the student will be occasionally referred to Meumann's Psychology of Learning (trans. by Baird).

C. **The Psychology of the Abnormal Mind.** G. S. 137. Credit, one hour. M W F, 11. Dr. BORING.

Primarily a lecture course, although opportunity will be given for discussions and for reports upon assigned reading. From time to time demonstrations will be arranged. No knowledge of psychology is presupposed. Emphasis will be laid upon the relation of the abnormal to the normal mind and upon the occurrence of the abnormal in every day life. The lectures will treat of the minds of exceptional and defective persons, including the feeble-minded and geniuses; of mental derangements, such as hallucinations, illusions, hysteria, dreams, hypnotism, and telepathy; and of the disorders of sensation, perception, feeling, and memory, occurring in the insanities. Methods for testing intelligence and mental defect will be considered; and the course will conclude with a discussion of the inheritance of mental traits in relation to eugenics.

D. **Introductory Laboratory Course.** Psychological Laboratory, Morrill Hall. Credit, two hours. M W F, 2.00–4.30. Drs. FOSTER, BORING, and Mr. DIMMICK.

The aim of this course is to furnish the student training in psychological methods, and to give him a first-hand acquaintance with the contents of his own mind. The laboratory consists of twenty-seven rooms on the upper floors of Morrill Hall, including dark rooms, work-shops, and offices. The equipment on the side of apparatus is especially complete, embracing besides the standard pieces for qualitative experiments a great variety of special instruments. The entire equipment of the research laboratory is also available for demonstrations. Experiments will be performed in vision, audition, and the other departments of sense, in feeling, attention, perception, and idea, and toward the end of the work the student will be in a position to carry out experiments upon the more complex processes of association and action. The textbook will be Titchener's Experimental Psychology, vol. i, Qualitative Student's Manual.

E. **Advanced Work in Psychology.** Psychological Laboratory, Morrill Hall. Hours and credit to be arranged. Drs. FOSTER and BORING.

As a prerequisite for this course, Course D or its equivalent is necessary. The work may consist either of essays and reports upon some special topic, or of laboratory practice at a higher level than that of Course D.

PHILOSOPHY

A. **History of Modern Philosophy.** Daily except Sat., 9. G. S. 231. Credit, two hours. Dr. WRIGHT.

A series of lectures and informal discussions furnishing an outline of the history of philosophical thought during the modern period; the various movements and systems interpreted in relation to scientific, social, religious, and educational tendencies contemporary with them. Emphasis will be placed upon the philosophers of the more brilliant periods, such as the Renaissance and Enlightenment, and some notice will be given to the changed logical and ethical standpoints that have arisen in recent times in consequence of the doctrine of evolution, and of altered social and economic conditions. Readings will be assigned in the standard histories of philosophy, and in the writings of the philosophers themselves, to be found in the Library, and no regular text-book will be used. No prerequisites.

B. **Philosophy and Psychology of Religion.** Daily except Sat., 12. G. S. 227. Credit, two hours. Dr. WRIGHT.

This course will begin with a series of lectures upon some of the more important phases of contemporary individual and social religious experience, interpreted in the light of the psychology of adolescence, the sub-conscious, and the rise and development of social and moral self-consciousness in the individual. The latter part of the course will be more narrowly philosophical, and will treat of the nature and objective validity of such postulates of religious faith as a moral world order, immortality, and God. No prerequisites. Some collateral reading and the preparation of two papers, one on a philosophical, and one on a psychological subject, will be required of those who take the course for credit.

ENGLISH

A. **Composition.** Daily except Sat., 9. G. S. 160. Credit, two hours. Mr. BALDWIN.

A practical drill intended for those who lack proficiency in writing: frequent short themes and several longer papers, expository, descriptive, and narrative; discussion of the elements and forms of discourse; weekly personal conferences at hours to be appointed. This course and course B (see below), taken together, will be considered the equivalent of the first term of course 1 in the regular University session.

B. **Introductory Course in Literature.** Daily except Sat., 10. G. S. 164. Credit, two hours. Dr. BROUGHTON.

A study of four modern novels, one each of Scott, Thackeray, Dickens, and George Eliot, and selected lyrics. This course and course A (see above), taken together, will be considered the equivalent of the first term of course 1 in the regular University session.

C. **Teachers' Course.** Daily except Sat., 9. G. S. 156. Credit, two hours. Dr. BAILEY.

Designed for those who are teaching English, or who expect to teach the subject. Methods of treating the novels, the poems, and the essays named by the Conference on Uniform Entrance Requirements in English; discussion of related topics in composition and in grammar.

D. **Modern English Grammar.** M W F, 8. G. S. 160. Credit, one hour. Dr. BAILEY.

A study of the grammatical structure of the modern English sentence, with special reference to the textbooks ordinarily used in primary and secondary schools. Discussion of the terminology adopted in recent treatises, consideration of problems in sentence structure, and drill in syntax. Credit gained in this course may not be used to meet the underclass English and history requirement in the University. Text: Blount and Northrup's English Grammar.

E. **Nineteenth Century Poets.** Daily except Sat., 12. G. S. 164. Credit, two hours. Dr. BROUGHTON.

A study of some of the greater English poets of the past century, with particular reference to the significance of their work as a whole. Reading and discussion of numerous poems of Wordsworth, Byron, Shelley, and Keats. Texts: Oxford editions of the authors named.

F. **Shakespeare.** Daily except Sat., 8. G. S. 156. Credit two hours. Mr. BALDWIN.

Designed mainly for high school teachers of English. A study of three or four of the greater tragedies, with comment on textual difficulties and discussion of important problems of character and plot. Stress will be laid on one play, the choice of which will depend on the preference of the class. Text: Bradley's Shakespearean Tragedy.

G. **Advanced Composition.** Daily except Sat., 9. G. S. 162. Credit, two hours. Dr. GILBERT.

Designed for students who have already had such elementary training as is given in freshman courses in English. The work will be arranged to meet, as far as possible, the special needs of the individual members of the class. Drill in the writing of essays, arguments, stories, etc.; preparation of manuscript for publication; proof-reading. Open to students who have received credit for one year of collegiate work in English, and to those others who submit satisfactory specimens of their own composition. Such specimens, involving about one thousand words, should be sent to Dr. A. H. Gilbert, Goldwin Smith 173, Ithaca, N. Y., prior to the first of July.

H. **Milton.** Daily except Sat., 12. G. S. 162. Credit, two hours. Dr. GILBERT.

Designed mainly for high school teachers who wish to use a knowledge of all of Milton's poetry in English as a necessary foundation for teaching the minor poems. Rapid reading of the early poems, Paradise Lost, Paradise Regained, and Samson Agonistes; detailed study of selected passages; reference to the Iliad and the English Bible, and to important critical material. Text: Oxford Milton, edited by Beeching.

J. **Victorian Poets.** Daily except Sat., 11. G. S. 156. Credit, two hours. Dr. BAILEY.

A study of Tennyson, Browning, Matthew Arnold, Rossetti, and Swinburne. Reading of numerous poems; discussion of the relation of the several authors to the significant religious, social, and political movements of their period.

K. **Poetry.** Daily except Sat., 10. G. S. 156. Credit, two hours. Professor SAMPSON.

A study of poetical principles and practice, as exemplified in English poetry. Consideration of the nature of poetic material, content, and structure; types of poetry; discussion of metrical forms in verse and stanza; occasional drill in versification. Open only to those students who have had a year's work (or its equivalent) of English in college.

L. **Modern Drama.** Daily except Sat., 11. G. S. 160. Credit, two hours. Professor SAMPSON.

An advanced course designed for those who have completed two or more college courses in English, or whose reading serves as an equivalent for freshman and sophomore work. The course will be sufficiently varied from that offered in 1914 to permit the enrollment of former students on condition of their accomplishing a specified amount of collateral reading.

Reading and discussion of characteristic plays of some of the more important recent dramatists—Ibsen, Hauptmann, Brieux, Shaw, and others whose dramas have commanded serious attention; consideration of the modern theatre; current theories of drama.

Attention is called to the course of introductory lectures on the Science of Language, page 31.

PUBLIC SPEAKING—ORAL ENGLISH

In all the courses described below, individual instruction will be given by appointment. In this way the particular needs of each student, however varied they may be, can be met. No fees will be charged for this special instruction.

A. **Public Speaking.** Daily except Sat., 11. G. S. 21. Credit, two hours. Mr. DRUMMOND.

A practical training for speaking in public. Original speeches and selections; extemporaneous speeches. Methods of preparing will be discussed and illustrated. High school teachers will find the methods applicable to their work. Regular students passing this course will be admitted to the work of the second term in Public Speaking, course 1.

B. **Voice Training.** Daily except Sat., 8. G. S. 21. Credit, one or two hours as arranged at the beginning of the course. Assistant Professor MUCHMORE.

This course consists of exercises, both physical and mental, for the development of pure tone, flexibility, melody and strength of voice, clear enunciation, and for relief from high, strained tones, harshness, throatiness, and speakers' sore-throat. Private appointments will be given each student, in which the voice will be tested, and, if needed, special exercises prescribed. The course necessarily includes training for poise and ease of action. The relation of the voice in conversation, teaching, and public speaking to health is emphasized.

D. **Oral Reading.** Daily except Sat., 10. G. S. 21. Credit, two hours. Assistant Professor MUCHMORE.

This course is designed especially to help teachers of literature, but is open to all students. The first part of the course will be devoted to the elements of reading; attention, individualization, and sequence of ideas. The second part will be given to the oral interpretation of great pieces of literature, with special emphasis on the spirit rather than the form. Each member of the class will receive private appointments, and will prepare individually at least one selection. Matriculated

students who pass this course will be admitted to course 10 in public speaking in the second term.

E. **Dramatics.** M W F, 9:00. G. S. 26. Credit, one hour. Consent of instructor necessary for admission. Mr. DRUMMOND.

The course is intended to give teachers sufficient knowledge of the production of a play to meet the growing interest in educational dramatics. There will be consideration of choice of plays, elements of training, staging of plays, and other practical phases of production. Reading of plays to insure sufficient familiarity with suitable dramatic literature will be required. One act plays will be given.

FRENCH

Courses A, B, C, afford the student an opportunity of gaining a working knowledge of French and also a chance to make a rapid review of the subject. The other courses are intended for teachers and graduate students. The members of the Department will be very glad to supervise the work of graduate students in any special field of investigation.

A. **First Year French.** Grammar, reading, composition, and conversation. Walter and Ballard, Beginners' French. Daily except Sat., 8 and 12. G. S. 283. Professor MASON. University credit, one unit.

The object of this course is twofold: first, to give beginners a thorough drill in the essentials of French pronunciation, grammar, and reading; second, to offer to teachers an opportunity to study methods of presentation of these subjects to beginners. By supplementary reading after the Summer Session the beginner can prepare himself for the fall examinations in Second Year French, or he may complete the work for the second unit by taking in the University a special course three hours a week.

B. **Second Year French.** Grammar review and reading. Fraser and Squair's French Grammar. François' Elementary French Prose Composition. Bazin's Madame Thérèse (Oxford Press); About's Le Roc des Montagnes (Heath) Labiche and Martin's Le Voyage de M. Perrichon (Ginn); Lesage's Gil Blas (Heath); Merimée's Colomba (Holt). Daily except Sat., 8 and 12. G. S. 281. Assistant Professor PUMPELLY. Credit, four hours. Entrance credit, one unit.

C. **Third Year French.** Sardou's Les Femmes Fortes (Oxford Press), Quelques Contes des Romanciers Naturalistes (Heath), Bazin's Le Blé qui lève, Merimée's Contes et Nouvelles (Oxford Press), Vigny's Canne de Jonc, François' Advanced French Composition. Professor GIROUD, daily 8 and 12. G. S. 290. Credit, five hours. Entrance credit, one unit.

This course is intended for those who have had two units of preparatory school French, or one year of college French. Students taking this course are expected to devote their entire time to the subject.

D. **The Novel in French Literature from 1850 to 1900.** Lectures and reports. M W F, 9. G. S. 283. Professor MASON. Credit, one hour.

The work of the more important novelists of the second part of the nineteenth century will be studied by means of lectures and discussions in French. The course is especially designed for those who have had little practice in listening to lectures in French. Graduate students taking the course will be assigned a large amount of reading and a topic for independent investigation.

E. **An Introduction to French Philology.** Lectures and Explications de Textes. M W F, 11 G. S. 281. Assistant Professor PUMPELLY. Credit, one hour.

The fundamental principles of Old French phonology and morphology will be treated in the lectures. The Explications de Textes, based on the Chanson de Roland (Ed. Gaston Paris, Ginn & Co.) will be used as illustrative material for the lectures, and will consider in detail the laws governing the derivation of French from Vulgar Latin. Constant attention will be paid to the application of a knowledge of Old French philology to the teaching of modern French.

F. **Molière.** Lectures in French. Professor GIROUD. T Th, 11. G. S. 281. Credit, one hour.

G. Lectures in French and English on subjects of interest to students of Romance languages and open to the public will be given on Tuesday evenings by members of the department. The subjects of the lectures and the room will be announced later.

Portuguese. If five persons shall assure the Director of the Summer Session in writing, not later than June 20th, of their intention to pursue a course in first year Portuguese, it will be provided.

Attention is called to the course of introductory lectures on the Science of Language, page 31.

SPANISH

A. **First Year Spanish.** Spanish for beginners. Grammar, translation, reading, composition, and conversation. Cœster's Spanish Grammar. Elementary readers and texts. Daily, 8 and 12, and three additional hours a week to be arranged. G. S. 290. Assistant Professor KENISTON. Credit, six hours. Entrance credit, two units.

The object of this course is to afford to those who have had no Spanish an opportunity to acquire the essentials of the grammar, to learn to translate easy Spanish readily, to read Spanish as Spanish intelligently, to understand spoken Spanish, and to acquire sufficient vocabulary to be able to converse on topics of daily life. Spanish will be spoken, as far as feasible, in the class room.

There will be twelve prepared recitations a week; the three additional hours will be devoted to conversation, dictation, and written grammatical exercises.

After successfully completing this course, the students will be far enough advanced to be able to pursue the second year Spanish course in the University.

B. **Second Year Spanish.** Designed to follow Spanish A. This course will consist of readings and translation from representative Spanish writers, with informal talks, mainly in Spanish, on topics of related interest, such as Spanish history, literature and art. Daily except Sat., 9. G. S. 124. Credit, two hours. Dr. VAUGHAN.

Textbooks: Pérez Galdós, Marianela; Valdés, José; Ibáñez, La Barraca. If desirable Cervantes, Don Quijote or Calderón, El Mágico Prodigioso may be substituted for either of the last mentioned texts.

C. **Training Course for Teachers.** Daily except Sat., 10. G. S. 124. Credit, two hours. Dr. VAUGHAN.

This course is designed for those intending to teach Spanish in secondary schools. The work consists of a careful study of Spanish pronunciation and idioms, both in Spanish and Latin America, a review of the grammatical difficulties and the best methods of presenting them to the student, based upon the grammars in most common use, and daily exercises in Spanish composition. Other topics treated will be: (1) the proper selection of reading matter for the different years of the course; (2) the place of translation in connection with reading; (3) reading without translation; (4) the historical and geographical background; (5) formal prose composition and free composition; (6) grammar in its relation to language; (7) the importance of commercial Spanish; (8) the use of Spanish magazines as adjuncts to class room work and in the library; (9) the advisability of Spanish "clubs" and the results that may be obtained by them; (10) the question of books, phonographs, and other means of self-improvement for the teacher.

Required textbooks are, Olmsted and Gordon, Spanish Grammar; and Crawford, Spanish Composition.

Students of Courses B and C are invited to meet once a week with the instructor for an evening of Spanish games and conversation preceded by an informal lecture in Spanish.

D. **Spanish Literature.** For students who have had course B or its equivalent. Early texts will be read as well as those of a later period. Special emphasis will be laid upon the development of the novel and drama and their influence upon other European literatures. A thesis will be required. Dr. VAUGHAN.

Required textbooks are: Ford, Old Spanish Readings; Lazarillo de Tormes in the Bibliotheca Romanica.

GERMAN

Courses A, B, C, afford the earnest worker an opportunity to gain a working knowledge of German by highly concentrated effort, and a chance to make a rapid review of previous reading.

The other courses are intended for teachers and for students of considerable proficiency in the subject. They present opportunity for advanced study in language, grammar, and literature, and also are intended to give direct practical assistance in all the various problems which confront the teacher. Students are urged and encouraged in every possible way to use German in and out of the class room. See particularly under course J, page 30.

A. **First Year German.** Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 183. Assistant Professor POPE. University credit, four hours. Entrance credit, one unit.

This course affords an opportunity for those who have had no German to acquire a practical working vocabulary, to master the essentials of grammar, to learn to read easy German, and to begin conversational work in the language. As far as possible the language of the class room will be German. Two recitations will be held daily except Saturday with sufficient time between the two for the preparation of the second lesson. Textbook: Zinnecker's "Deutsch für Anfänger." After successfully completing this course, students can, by supplementary reading during the summer, prepare themselves for the fall entrance examination in second year German, or they may take the second year German course

during the first term of the regular college year. Dr. POPE will be in Room 182, T, Th, 9, to give special assistance to members of this class.

This course also affords teachers of German an opportunity for observation of methods of teaching.

B. **Second Year German.** Oral and written use of the language based on the reading of German texts. Review of important topics of grammar in connection with the reading. Two recitations will be held daily except Saturday with sufficient time between the two for the preparation of the second lesson. Text-books: Storm's Immensee (ed. by Elmer & Neumarker, Chas. E. Merrill Co.), and Hillern, "Höher als die Kirche" (ed. Heuser, Chas. E. Merrill Co.).

Prerequisite: one year of high school German or its equivalent. Those who do not present certificates showing the completion of one year's work in German will be required to take a test at the beginning of the course. This course is equivalent to the second year of high school German and its completion entitles the student to a second unit of entrance credit in German. University credit, four hours. Daily except Sat., 8 and 12. G. S. 177. Dr. MONTESER. The instructor will be in room 178, T Th, 10, to afford special assistance to members of this course.

C. **Third Year German.** Reading and translation of German texts accompanied by exercises in grammar, composition, and conversation. Two recitations a day will be held, with a sufficient interval to enable the student to prepare for the second recitation. Text-books: Joynes-Wesselhoeft's German Lesson Grammar, Storm's "Pole Poppenspäler (Scribner edition); Riehl's "Der Fluch der Schönheit;" Freytag's "Die Journalisten." Prerequisite: two years of high school German or its equivalent. The completion of this course entitles the student to the third unit of entrance credit in German. Daily, 8 and 12. G. S. 134. Dr. ZINNECKER. University credit, five hours.

The instructor may be consulted T Th, 9 in room 178.

[**Advanced Course in Modern German Grammar.**] Not given in 1915.

D. **History of the German Language.** Daily except Sat., 11. G. S. 236. Credit, two hours. Assistant Professor BOESCHE. A study of the development of modern German with constant attention to the practical needs of teachers. The course aims particularly at the explanation of modern German accidence and syntax in the light of our knowledge of past stages of the language.

E. **Advanced Composition and Conversation.** Daily except Sat., 8. G. S. 190. Assistant Professor DAVIDSEN. Credit, two hours. This course will aim to train the students to write and to speak correct German. It will be conducted as far as possible in German. Papers, based upon pictures and works of literature discussed orally in class, will be handed in regularly and corrected by the teacher. Certain hours will be set aside for instruction in elementary phonetics, if the class so desires.

[**Studies in the Style and Technique of the Nineteenth Century Prose Writers.** Assistant Professor DAVIDSEN.]

Not given in 1915.

[**Comparative Studies in the German Drama.** Assistant Professor DAVIDSEN.]

Not given in 1915.

F. **Hebbel and Ibsen.** A study of their principal dramas and of their general influence on the modern German drama. Daily except Sat., 9. G. S. 183. Assistant Professor DAVIDSEN. Credit, two hours, with one hour more for extra work assigned.

The exercises will for the most part be conducted in German. Editions used: Friedrich Hebbel's Sämtliche Werke (Leipzig, Hesse); Henrik Ibsen's Gesammelte Werke (Leipzig, Reclam); both obtainable in Ithaca.

[**Life and Works of Goethe.**]

Not given in 1915.

G. **Life and Works of Schiller.** Daily except Sat., 10. G. S. 236. Credit, two hours. Assistant Professor BOESCHE. A comprehensive presentation of Schiller's life, work, and personality. Lectures, in German only, will alternate with discussions in which each student, while not obliged to use German, will be encouraged to do so. The required reading in this course and the detailed discussion in class will deal particularly with Schiller's æsthetic and philosophic development.

A good cheap edition of Schiller's works will be obtainable in Ithaca.

H. **Training Course for Teachers.** Daily except Sat., 10. G. S. 190. Dr. MONTESER. Credit, two hours, with an extra hour for work assigned.

The aim of this course is to aid the teacher of modern foreign languages in the practical solution of class room problems by a study and demonstration of methods used by progressive teachers in Europe and in this country.

Among the topics to be treated are the following: a brief history of the teaching of German in the United States; the Report of the Committee of Twelve; the reform movement in the teaching of foreign languages in Germany and other European countries; the educational value of German; the aim of the teaching of German in the high school; the question of introducing German into our elementary schools; the bearing of certain results of modern psychology on the instruction in modern languages; the place of phonetics; standard pronunciation; the inductive method of teaching grammar; the treatment of special topics in grammar and syntax; drill and habit-formation; "living" grammar; the Gouin method; use of connected texts and of detached sentences in elementary language work; the relation of oral work to written exercises; the building up of a vocabulary; the amount and proper selection of reading matter for the different years of the course; the place of translation in connection with reading; reading without translation; dramatization of stories; the treatment of poems; the historical and geographical background of the reading matter, leading to a sympathetic understanding of the life of the German people; the use of pictures and other illustrative materials; formal prose composition and free composition; the use of German journals and magazines; helpful adjuncts to class room work, such as the use of a pupils' library, a German "Verein," and international pupils' correspondence; the preparation of the teacher and aids to self-improvement.

The New York State Syllabus, the requirements of the College Entrance Examination Board, and the present syllabi for the teaching of modern foreign languages in the elementary and high schools of the city of New York will also be studied.

In order to help the teacher in the selection of textbooks to be used with beginners, an exhibit of the most recent grammars and elementary readers will be made, and a number of these will be critically studied by the students.

J. **Richard Wagner.** Sat., 9–10, 10–11, Wed. evening, 8:15. Barnes Hall Auditorium. Assistant Professor POPE. Credit one hour. Open to students of all departments.

Lectures in English on Wagner's theory of the music drama, the sources of his operas, his place in German literature and music, and his influence on modern culture.

The evening periods will be devoted to recitals illustrating the principal operas by means of selections for piano and violin and the Victor records of the chief vocal parts as rendered by the leading Wagnerian singers.

Deutsches Haus

In order to give greater opportunity for hearing and speaking German, the residence of Professor W. T. Hewett, has again, as in 1914, been rented for the exclusive occupancy of women students in German. It is five minutes walk from Prudence Risley Hall, where the meals will be taken, and in one of the most beautiful parts of the town. Miss Elizabeth Undritz will have charge of the house and of the table.

As the number who can be accommodated is limited, prospective students are asked to communicate at once with Professor H. C. Davidsen, Highland Avenue.

Attention is called to the lectures on the **Science of Language,** page 31.

GREEK

The courses offered are intended for graduate or advanced undergraduate work. They are suitable for teachers of other languages than Greek, Latin in particular.

A. **The Greek Language.** Daily except Sat., 8. G. S. 137. Credit, two hours. Professor BRISTOL. Lectures, assigned readings and practice exercises.

Outline of topics; characteristics of Greek and its relations to kindred languages; early epigraphic monuments; commercial and official uses; the development of writing; history of Greek and Latin alphabets; normalizing of the language for literary purposes; the language in mythology and religion; the Greek New Testament; the Egyptian papyri; the Greek in Latin, and in modern scientific terminology; the world wide employment of the language today.

B. **Lyric Poetry.** Daily except Sat., 9. G. S. 125. Credit, two hours. Professor BRISTOL.

The reading of selections from Hiller-Crusius' Anthologia Lyrica chosen to represent the development of literary types, and to include as far as possible the best known poems. The study of noted translations into English.

LATIN

The courses in Latin during the Summer Session are intended for teachers and prospective teachers in secondary schools. Qualified students may begin or may continue their work in candidacy for the degree of master of arts, and courses A and C are reckoned as graduate courses for candidates for the degree A.M. Correspondence in advance concerning graduate work is invited, and prospective graduate students should confer with Professor Durham immediately after their arrival in Ithaca.

The particular attention of students is called to the course of introductory lectures on the science of language, and all students in course A in Latin should arrange their schedules of work so that they may be able to attend these lectures.

A. **Lectures on Latin Syntax.** With particular reference to the subjunctive mood, and to the teaching of syntax in secondary schools. Credit, one hour. M W F, 10. Goldwin Smith 128. Professor DURHAM.

B. **Latin Conversation and Oral Composition.** For teachers of Latin in secondary schools. Credit, one hour. T Th, 10. Goldwin Smith 128. Professor DURHAM.

C. **Lyric and Elegiac Poetry: Catullus and Horace.** An advanced course in Latin poetry, intended primarily for graduate students candidates for the degree of master of arts. Credit, two hours. Daily exc. S, 11. Goldwin Smith 128. Professor DURHAM.

LECTURES ON THE SCIENCE OF LANGUAGE

A course of twenty-one lectures given by professors in the Departments of Greek, Latin, German, French, and English. All teachers of foreign languages and of English are urged to arrange their schedules of work so that they may be able to attend these lectures.

All of the lectures will be given at 12 o'clock noon in Goldwin Smith Hall, room 128. Credit, one hour.

1. Introductory Lecture, Friday, July 9. Professor BRISTOL.

2–3. The Indo-European Family of Languages, their grouping and general status of relationship; a brief sketch of grammatical and linguistic study from classical times down to the present. Monday, July 12, and Tuesday, July 13. Professor DURHAM.

4–9. The Principles of Phonetics, with especial reference to English, to German, and to French. Wednesday, July 14 through Wednesday, July 21. Professor DAVIDSEN.

10. Analogy. Thursday, July 22. Professor DURHAM.

11–12. Semantics. Friday, July 23, and Monday, July 26. Professor BOESCHE.

13. Phonetic Laws. Tuesday, July 27. Professor DURHAM.

14–15. The Germanic Group of the Indo-European Family. Wednesday, July 28, and Thursday, July 29. Professor BOESCHE.

16–17. Latin and Vulgar Latin; the beginnings of romance philology. Friday, July 30, and Monday, August 2. Professor DURHAM.

18–19. A Brief Sketch of the English Language. Tuesday, August 3, and Wednesday, August 4. Professor ———.

20–21. A Brief Sketch of the French Language. Thursday, August 5, and Friday, August 6. Professor PUMPELLY.

HISTORY AND GOVERNMENT

A. **American Government and Politics.** Daily except Sat., 8. G. S. 234. Credit, two hours. Professor BRETZ.

A study of the more important questions of government and politics at the present time. Among the topics discussed are the power of the courts to declare legislation unconstitutional and the problems arising from the exercise of that power; the amendment of constitutions, state and federal; citizenship and naturalization; the interpretation of the Fourteenth and Fifteenth Amendments; problems arising from our insular possessions; the treaty-making power of the United States; and other matters of current significance. While some attention will be paid to the structure of government the emphasis will be upon its operation. The work consists of reading specially assigned references and discussion in class. No text is used.

[**American History, 1787–1850.** Professor BRETZ.]

Not given in 1915.

B. **American History. The Period of Civil War and Reconstruction, 1850–1875.** Daily except Sat., 10. G. S. 234. Credit, two hours. Professor BRETZ.

This is a general course covering the principal topics in the period indicated. As an aid to those teaching American History attention will be directed to the best historical literature on the Civil War and Reconstruction and the results of the more recent study of the field will be discussed. Woodrow Wilson's Division and Reunion will be used as a summary and the chief reference will be J. F. Rhodes, History of the United States from the Compromise of 1850.

D. **Greek and Roman History.** Daily except Sat., 9. G. S. 134. Credit, two hours. Professor SILL.

A general view of the rise, the progress, the achievements and the decline of Greek and Roman civilization. The lectures will deal especially with the most significant features of this development, including the civilization of Crete, the rise of Ionia, Greek colonial expansion, the Greek victory over Persia, Athens in the age of Pericles, the Macedonian conquest, the Hellenistic age, the Roman unification of Italy, Roman imperialism, Hellenism at Rome, the Roman revolution, the Augustan age, the Roman Empire in the second century after Christ, and the decadence of the ancient world.

E. **English History to 1485.** Daily except Sat., 11. G. S. 242. Credit, two hours. Professor LUNT.

A survey of the salient aspects of political, constitutional, economic, and social development. The lectures deal with the land and the people; the development of a Teutonic civilization; the changes wrought in the social and legal framework by the imposition of feudalism; the foundation of the English constitution; the gradual rise of representative institutions; the relations with the continent; the introduction and spread of Christianity; the growing power of the church and the conflict between church and state; life in town and country; the growth of commerce and industry and the rise of the middle class; intellectual currents and the birth of modern England.

[**English History. 1485–1914.**] Not given in 1915.

[A survey of the salient aspects of political, constitutional, economic, and social development. A continuation of course E to the present. The lectures deal with

the part played by England in the international rivalries of the sixteenth century; the reformation; the economic and social changes under the Tudors; the struggle between crown and parliament under the Stuarts; the foundation and expansion of the empire; the growth of cabinet government; the economic revolution; parliamentary reform; parties and politics; and other similar topics.]

F. **Medieval History.** Daily except Sat., 10. G. S. 242. Credit, two hours. Professor LUNT.

A survey of the history of Europe from the barbarian invasions to about 1300 A.D. Such topics will be considered as the later Roman Empire; the early Germans; the migrations; Christianity and the Church; the rise of Mohammedanism; the Frankish kingdom; the empire of Charlemagne; the empire and the papacy; the crusades; feudalism; life in town and country; intellectual development.

G. **European History since 1814.** Daily except Sat., 12. G. S. 242. Credit, two hours. Professor SILL.

A survey of the internal development and the external relations of the leading countries in Europe during the past hundred years. The period between 1814 and 1848 will be treated in introductory lectures; more extensive consideration will be given to the establishment of the German Empire, to the unification of Italy, and to the Eastern Question; and as much attention as possible will be given to the political, economic, social and intellectual history of recent years.

ECONOMICS AND SOCIAL PROBLEMS

The following courses are designed to meet the needs of three classes of students in the Summer Session: (1) those desiring regular college credit for general economics; (2) students with special interests in economic and social subjects; (3) students seeking broad preparation for the teaching of economics in secondary schools. For the first group, Courses A and B together cover the subject matter usually included under elementary economics, for Cornell students, Courses A, B and C substitute directly for the six hours of Economics 51 of the regular year, or Courses A and C for the first term, and A and B for the second. Courses A and C substitute for both terms of Economics 52, or Course A for the first term and C for the second term.

A. **Principles of Economics.** Daily except Sat., 11. G. S. 264. Credit, two hours. Assistant Professor TURNER.

This course is concerned with the foundations of economics. It centers around value, money, prices, credit, banking, and exchange. While the course will be theoretical, various important practical and social aspects will be constantly emphasized.

B. **Economic Problems.** Daily except Sat., 8. G. S. 264. Credit, two hours. Assistant Professor BLAKEY.

This course will give a general survey of the following topics, special attention being given to current legislation. Labor problems: trade unions, cooperation, social insurance, labor legislation. The tariff: free trade, protection, subsidies, bounties. Taxation: customs, income, inheritance, corporation, general property and other taxes, and questions of tax reform. Railways: economic characteristics, rate making, discriminatory practices, regulation, government ownership.

Trusts and monopolies: modern industrial development, monopoly vs. competition, large vs. small scale operations, problems of regulation and control. Socialism: the case against capitalism, the program of socialism, the outlook.

C. **Corporation Finance and the Trust Problem.** Daily except Sat., 10. G. S. 264. Assistant Professor TURNER.

A study of the modern business corporation. The following topics will be given special attention. The nature of a corporation together with its advantages and disadvantages, compared with the partnership and joint stock company; problems of finance and promotion; stocks and bonds, what they are, the basis of their issue and the principles of their valuation; questions of capitalization; financial reports, the balance sheet and income statement; reorganization and receiverships; the problem of regulation.

D. **American Social Problems.** Daily except Sat., 9. G. S. 264. Credit, two hours. Assistant Professor BLAKEY.

This course will give a general survey of the following questions with particular reference to American conditions: the family, divorce, child welfare, women in industry, the theory of population, degeneracy, eugenics, race suicide, the liquor problem, poverty, charities and corrections, immigration, growth of cities, tenements, slums, social settlements, recreation, social surveys, rural social problems, changing conceptions of the work of school, church, state and other social institutions.

MUSIC

Most of the courses offered consist of five exercises a week, one each week day except Saturday. The number of actual hours of class work in any course may be found by multiplying the weekly exercises by six.

The word "hour" used in speaking of University credit, means the equivalent of one class exercise a week for a half year. One hundred and twenty such hours constitute the "hours" requirement for the degree of Bachelor of Arts.

COURSES FOR SUPERVISORS OF MUSIC

These courses are primarily intended for the training of supervisors and special teachers of music in the public schools, normal schools and colleges. The time required for the completion of the work depends on the ability and capacity of the student and upon the amount and quality of training which the student has had previous to entrance.

Students who are proficient in sight reading, ear training, piano playing, and singing, and who pass the examinations for the preparatory and first year courses, may complete the work in two Summer Sessions. Others will find it necessary to attend three or four Summer Sessions, with a considerable amount of study at home during the academic years between Sessions. Full and detailed information in regard to this home study may be had on application to Professor Hollis Dann.

Entrance examinations are given to each new student; credit for previous work done at other institutions or under private teachers is based upon the results of these examinations.

The limit in numbers was practically reached at the 1913 and 1914 sessions. To avoid overcrowding of classes, the Department of Music reserves the right to reject applications for admission made after the opening of the Session on July 5,

1915. Because of the large number in attendance, it has been found necessary to give the preference for admission to regular music students, over special students from other Departments.

ADVANCED COURSES

An increasing number of teachers who have completed the course for Supervisors return each year for advanced study. Several courses, open only to teachers who have completed the course for Supervisors of Music at Cornell University, are now offered. Subject to certain conditions relating to regular attendance, all A, B, C, and D classes are also open to these students.

PHYSICAL EDUCATION

Recognizing the demand for physical training in the public schools, and realizing the intimate relation which this subject, properly taught, bears to music in the schools, the department has included physical training in the course for Supervisors. Two expert teachers from London, England, have been engaged especially for this session to continue the work begun at the 1914 session.

Preparatory year courses are designated A. First year courses are designated B. Second year courses are designated C. Third year courses are designated D. Advanced courses are designated E.

COURSES OFFERED IN 1915

Sight Reading—A. This is an elementary course. For entrance, the student must possess sufficient aptitude and ability to pursue the subject with profit.

In order to complete this course the student must be able to sing at sight with facility, using the Latin syllables, simple music such as is taught in the first three grades of the public schools.

Daily except Saturday, 12:15, (two sections), Miss WHITE, Miss STARK.

Sight Reading—B. This course requires singing at sight, individually, music such as is taught in the first six grades of the public schools, with and without the Latin syllables.

Daily except Saturday, 9:15 (two sections), Mr. SCALES, Prof. HOERRNER.

Material and Sight Reading—C. The student is required to sing at sight, without accompaniment, reading words and music simultaneously, the music used in the upper grades of the public schools and in the high school. Definite knowledge concerning the suitability and use of material for the grammar grades is also required. A written examination, relating to material, is required for the completion of this course, supplementing an oral sight reading test.

University credit, one hour.

Daily except Saturday, 12:15, (two sections), Mr. SCALES, Prof. HOERRNER.

Proficiency in sight singing is of great advantage to the student entering the Supervisor's Course. Students planning to enter the course for Supervisors are strongly advised to acquire the ability to sing simple music at sight, using the syllable names.

Dictation—A. (Study of tone and rhythm). The subject matter of music is presented first to the sense of hearing. In this course the student gains the power

to think tones and to sense rhythms, acquires a practical knowledge of the scale and the Latin syllables used in sight reading, and gains the ability to recognize and write simple melodic phrases.

Daily except Saturday, 9:15, (two sections), Miss WHITE, Miss STARK.

Dictation—B. This course deals with the problems of tone and rhythm included in the first five years in the public schools. Through the daily oral and written lessons the student gains the power to hear what he sees and to write what he hears.

University credit, two hours.

Daily except Friday and Saturday, 10:15, Mr. BUTTERFIELD.

Dictation—C. This course includes the sixth, seventh, and eighth years of tone and rhythm study in the public schools. The student is required to write from hearing melodies of moderate difficulty in both the major and minor modes. Additional training, including the recognition and writing of music in two and three parts, is also required as a part of the necessary equipment of the supervisor.

University credit, two hours.

Daily except Saturday, 9:15, Mr. BUTTERFIELD.

These courses in ear training, together with the courses in sight reading and melody, give to the student a mastery of the elementary subject matter of music and constitute the foundational training which is essential for advanced study.

The superiority of the best European schools of music over most American schools is largely due to the thorough three year course in sight singing and dictation which is required of every student. The student in harmony and counterpoint hears and visualizes the chord and the melody before he writes them; the orchestral player hears the tones and feels the rhythm of a difficult passage before he plays it; the singer likewise acquires the musicianship which is gained by the ability to read and write the language.

The ability to read and write a language with facility is a prerequisite to any advanced study of its literature. This is as true of Music as it is of English or German. The proper place for this foundational training is in the elementary and secondary schools; the medium for its attainment is the supervisor of music.

Students planning to enter these courses are advised to acquire some degree of proficiency in recognizing and taking down simple melodies. Directions concerning home study will be given on application to the Principal of the Department of Music.

Material and Methods—B. This course is devoted to the study and demonstration of material and methods for the kindergarten and first five years in music, and is given by an experienced supervisor. The methods employed are those used in the school room. Special attention is given to the selection, presentation, and interpretation of rote songs for the several grades.

University credit, one hour.

Daily except Saturday, 11:15, Miss BRYANT.

Methods—C. This course is devoted to the pedagogical consideration of music from the kindergarten to the fifth year inclusive. The work of each year is taken up in detail and the problems which confront the grade teacher and supervisor are carefully considered.

On Friday of each week the lesson will consist of a demonstration of the year's work with a class of children from the Ithaca public schools. Students in this

course will thus have the opportunity of observing the practical application of methods to classes of children representing the grades from the kindergarten to the fifth year inclusive.

University credit, two hours.

Daily except Saturday, 10:15, Professor DANN.

Methods—D. This course is open only to students who have completed Methods C, and is concerned with the pedagogical consideration of music in the grammar grades. The course will deal with the details of teaching and supervision in the upper grades, and with the means of cultivating the musical taste and ideals of the school and community.

Instruction is given in this course for the proper training and directing of the grade teacher. The problems with which the supervisor has to deal are thoroughly considered.

Members of the class will make practical application of the methods in the form of practice teaching with classes of children.

University credit, two hours.

Daily except Saturday, 12:15, Professor DANN.

Rudiments of Music—A. This course provides instruction in the elements of music. The following are taken up for study: clefs, signification, and origin; names of pitches as established by the G-clef; construction of major scale (without key-signature); measure signatures, note-values, rhythms; normal, harmonic, and melodic minor scales; key-signatures; notation of chromatic scale with each key-signature; intervals; music terminology, etc.

Daily except Friday and Saturday, 10:15, Mr. SCALES.

Melody—B. The principles of melodic construction; normal rhythms and voice progressions; melody writing in the major mode, stepwise and with simple skips.

University credit two hours.

Daily except Saturday, 12:15, (two sections), Mr. JOHNSTONE, Mr. COGSWELL.

Melody—C. Melody writing in the minor mode; triads; dominant seventh chords; melody writing with special reference to triad suggestion; rhythmic variety as applied to melody; transposition.

University credit two hours.

Daily except Saturday, 11:15, Mr. JOHNSTONE.

Melody and Harmony—D. Melody writing for two voices; connection of triads in four-voice writing in major and minor; resolution of the dominant seventh; modulations; inversions of triads and seventh chords; harmonic analysis of compositions.

University credit, two hours.

Daily except Friday and Saturday, 10:15, Mr. JOHNSTONE.

High and Normal School Music and Conducting—D. This is an advanced course to which only third year and more advanced students are admitted. The many difficult problems which confront the music teacher in the high and normal school are carefully studied.

Some of the topics for special consideration are: the school chorus, orchestra, glee clubs, classification of voices, grading and classification of high school students

in music, bibliography of choral and orchestral music suitable for high and normal schools, preparation for teaching in normal and training schools, elective courses, credits for music.

A prominent feature of the work of this class is a practical course in conducting. Each student will be required to prepare and conduct choral selections under the supervision of the instructor.

University credit, one hour.

Daily except Saturday, 11:15, Professor HOERRNER, Mr. COGSWELL.

Practice Teaching—D. Practical use of material for all grades, and application of methods of teaching.

Each student will be given frequent opportunity for practice teaching under supervision of the instructor. Classes of children of different grades will be in attendance.

No student can complete the course for supervisors until he is able to demonstrate his mastery of the subject matter and methods by actual teaching. It is highly important that each student shall have had some experience in teaching in the public schools before entering this class. **A year's experience as a grade teacher is invaluable and almost indispensable.**

University credit, one hour.

Daily except Saturday, 9:15, Miss BRYANT.

History and Current Events—D. The course for Supervisors requires a general knowledge of the History of Music and a fair degree of familiarity with current events, especially in the world of music. An examination will be given to the third year class, covering only important and well known facts concerning the development of classical, romantic, and modern music; the great composers and their principal works; contemporary composers and their best known compositions; current musical events. Whatever special preparation is necessary must be made by means of home study. Hamilton's Outlines of Music History is suggested as a text book in the History of Music, and Musical America as a text for the study of current events.

Chorus. Required of all except students who have completed the course for Supervisors.

Five periods a week are devoted to chorus singing and to instruction in the technical and interpretative elements of choral music.

Topics for special consideration are: position, breathing, tone production, vowel study, interpretation, and the preparation and performance of choral music.

Cantatas and choruses suitable for high and normal schools will be sung by the chorus at the concerts given by the Department of Music.

Daily except Saturday, 8:00, Professor DANN.

Voice Training—E. Practical vocal lessons given to individual members of the class under class observation. Mr. HALL.

Daily except Saturday, 11:15, (July 12 to July 24).

Musical Composition—E. Open only to those who have completed Melody C, and Melody and Harmony D. This course includes instruction in the development of musical ideas (motives, themes); the logical sequence of keys; balance of

parts of a composition (elementary form); essentials of good melody; song writing; the unity of text and music in rhythm and in content; song accompaniments.

University credit, one hour.

Monday, Wednesday and Friday, 9:15, Mr. JOHNSTONE.

Musical Appreciation—E. Open to advanced students only. Musical artworks analyzed with a view to forming a basis for intelligent criticism.

The modern Player-piano as an aid in musical appreciation; as an art instrument; its recent applications to pedagogy; its special technique.

University credit, one hour.

Tuesdays and Thursdays, 9:15, Mr. JOHNSTONE.

Orchestral Technic—E. Open to advanced students only.

The Orchestra. Its instruments considered separately and in combination; the 23 part symphony orchestra, its sections and parts; smaller combinations—16, 14, 12, and 10 parts and piano; theory and mechanism of the instruments; the transposing instruments; the nature and idiomatic quality of the different parts; positions on the violin; the difficulties encountered in connection with different instruments; tuning and seating the orchestra; suitable music, methods of ordering, etc

University credit, two hours.

Daily except Friday and Saturday, 10:15, Mr. COGSWELL.

Physical Education—1. Open to all registered students.

1. Education of the Rhythmic Sense by means of physical movements.
2. Aesthetic Movements and simple dancing steps.
3. Children's Singing Games.
4. Folk dancing.

Daily except Saturday; hours to be arranged.

Miss SUTHERLAND, Miss ROBERTS.

Physical Education—2. Open to students who completed Course 1 at the 1914 Session, and to special students in Physical Education who devote their entire time to this work and are thereby enabled to take courses 1 and 2 simultaneously. Teachers who complete course 2 are qualified to teach Physical Culture in the public schools. University credit, two hours.

1. Rhythmic Movements and their application to the teaching of Music and Folk Dancing.
2. Aesthetic Movements and Dance steps.
3. Children's Singing Games.
4. Folk Dancing:
   (a) Old English.
   (b) National.
   (c) Court.
5. Methods of Teaching, and arrangement of Lessons of **Course A.**

(The course of Lectures on Physiology, Hygiene and Anatomy is required of students taking Physical Education 2.) Daily except Saturday; hours to be arranged.

Miss SUTHERLAND, Miss ROBERTS.

Each woman student who expects to take the work in physical education is advised to provide herself with a costume including dark blue or black serge bloomers and white middy-blouse. Suitable shoes may be purchased in Ithaca as directed by the instructor.

MATHEMATICS

In addition to the courses noted below, each teacher will have a daily office hour for consultation with students. It is urged that this opportunity be utilized by all concerned.

Courses A, B, and C are planned for those teachers in secondary schools who wish to review these subjects. They are equivalent to the advanced entrance requirements of Cornell University and of the College Entrance Examination Board. They presuppose a ready knowledge of elementary algebra (through quadratic equations), and of plane geometry.

Credit, A, B and C, three hours each.

A. **Advanced Algebra.** Daily, 9. White 6. Dr. SILVERMAN. (Office hour, 11, White 8). Daily, 10. White 21. Assistant Professor CARVER. (Office hour, 11, White 23).

B. **Solid Geometry.** Daily, 10. White 24. Professor SNYDER. (Office hour, 11, White 26).

C. **Trigonometry.** Daily, 8. White 6. Assistant Professor HURWITZ. (Office hour, 9, White 8). Daily 10. White 6. Dr. SILVERMAN. (Office hour, 11, White 8).

D. **Calculus.** Daily, 9. White 21. Credit, three hours. Assistant Professor CARVER. (Office hour, 11, White 23).

A short course in the essentials of differential and integral calculus. It is not the equivalent of any course in the calculus given during the regular academic year. A knowledge of the elements of analytic geometry is presupposed.

Courses E and F are equivalent, respectively, to the first and second terms of Course 6 in Mathematics, regularly given during the academic year. Course E presupposes A, B and C; Course F presupposes E. Students taking E or F are requested to take no other University work during the summer, without special permission.

University credit for E or F, six hours.

E. **Analytic Geometry and the Calculus.** Daily, 8 and 11. White 5. Dr. CRAIG. (Office hour, 9, White 4).

F. **Analytic Geometry and the Calculus.** Daily, 8 and 11, in four sections:

White 27. Assistant Professor SHARPE. (Office hour, 9, White 28).

White 2. Dr. OWENS. (Office hour, 9, White 4).

White 1. Dr. BURGESS. (Office hour, 10, White 3).

White 10. Dr. SLEPIAN. (Office hour, 9, White 11).

Courses G1 and G2 will be given in alternate years; together they furnish an adequate introduction to the geometry of algebraic curves and surfaces.

[G1. **Projective Geometry.** Not given in 1915.

In this course the principles underlying projective forms and constructions of the first and second degrees will be carefully developed. Particular attention will be paid to the application of these principles to elementary geometry, so as to make the work helpful to teachers of this subject. No knowledge of mathematics beyond plane geometry will be presupposed.]

G2. **Plane Algebraic Curves.** Daily, 9. White 24. Credit, three hours. Professor SNYDER. (Office hour, 11, White 26). A knowledge of elementary

analytic geometry and of as much projective geometry as is given in Course G1 will be presupposed. Systems of conic sections and the properties of the cubic curve will first be studied, then applied to a comprehensive study of linear and quadratic transformations. They will be interpreted in terms of motion, similarity, and reciprocal radii, as employed in elementary geometry.

H. **Analysis.** Daily, 11. White, 6. Credit, three hours. Assistant Professor HURWITZ. (Office hour, 9, White 8). A knowledge of the calculus is presupposed. The content of the course will vary from year to year, according to the needs and desires of the students.

Correspondence from possible applicants for the course will be welcome. The subjects to be treated will generally be selected from the following list: elementary differential equations; theory of limits and logical foundations of the calculus; theory of point-sets; infinite series; theory of functions of a complex variable.

K1, K2. **Teachers' Courses.** Dr. MCKELVEY. (Office hour, 9, White 26). Mathematical pedagogy and critical review. These courses are designed especially to meet the needs of teachers in the secondary schools. No knowledge of advanced mathematics will be presupposed. The work will deal primarily with methods and with the mathematical subjects found in the best high school curricula. These courses will not be particularly valuable for review purposes. Their aim is rather to give a comprehensive and rigorous understanding of high school algebra and geometry from the teacher's point of view. The work will be conducted chiefly by informal lectures with complete freedom for questions by members of the class at any time. A comparison of ideas and difficulties will be definitely encouraged.

K_1. **Elementary, Intermediate, and Advanced Algebra.** Daily except Sat., 8. White 25. Credit, two hours.

K_2. **Plane and Solid Geometry.** Daily except Sat., 10. White 25. Credit, two hours.

PHYSICS

All work in physics is given in Rockefeller Hall. Courses are given under the same numbers as during the regular academic year. Regular University students may take work under the same conditions as prescribed for the regular University terms and credit will be allowed as indicated below.

All courses are open to teachers who can take them with profit. Those who have not had college physics are advised to take courses 2 and 10. Those who have had college physics may take courses 8, or 9, and 14, and the lectures in course 2 may be attended even if not taken for credit. Teachers are entirely at liberty to take portions of courses when such an arrangement is to their advantage. Every effort will be made to adapt the work to the needs of students and to give opportunity to profit from the exceptional equipment of the laboratory.

2. **Lectures with Experiments and Recitations.** This course is intended to furnish a basis for all following courses as well as to give a fairly complete survey of general physics for those not intending to take up work depending directly on physics. The equipment for lecture demonstration is unusually complete and has been given careful attention by many members of the staff. Teachers and others familiar with the elements of the subject may find the course useful and suggestive.

The lectures will be given daily at 8 and will be followed by an informal discussion or recitation at 9. Kimball's College Physics will be used for reference.

Daily 8–10, Rockefeller B. Credit five hours.

Professors SHEARER and GIBBS.

3. **Problems.** An additional course in problem work based on course 2 may be arranged if six or more students apply before the third day of instruction. This can only be taken with 2 and the two courses cover the work required of first year mechanical engineering students.

Total credit, six hours. Assistant Professor GIBBS.

7. **Required recitations for Civil Engineers.** This course will be given if 8 or more students apply before the third day of instruction.

Daily except Sat., 8. Credit, three hours.

8. **Recitations in General Physics.** Theory and problems. This course includes work in mechanics, properties of matter, magnetism, and static electricity. It is to be accompanied by experiments in laboratory course 14. The course is intended to follow a first college course in general physics including lectures, demonstrations, and discussions. Course 8 is required of the engineering students of Sibley College in the first term of the sophomore year.

Credit, two hours. Prerequisite, either physics 2 and 3, or 2 and 10, and mathematics 5 or their equivalents. Daily except Sat., 9. Room 105. Assistant Professor RICHTMYER.

9. **Recitations in General Physics.** Theory and problems, continuation of course 8. Subjects treated include current electricity, quantity, capacity, induced electromotive force. Required of engineering students in Sibley College during second term of sophomore year. Daily except Sat., 8. Room 105. Mr. POWER.

10. **Physical Laboratory.** This course is one primarily designed for teachers of elementary physics and for those students who have had or are taking a lecture course covering thoroughly elementary physical principles in the various branches. In general, the simpler forms of apparatus are used but of such a grade as to adapt them to the needs of careful investigators. The apparatus available affords study in units and their relations, statics, kinetics, molecular physics, light, sound, electricity, and magnetism. The work may at the beginning of the term be arranged for each individual, covering as many or as few of the general divisions of the subject as seems desirable. The work may be varied to meet the needs of the students as the work progresses, since in all cases individual instruction is given. Each student will thus have the opportunity to devote his energies to his chosen part of the subject. Occasional discussions of general interest may be held covering such subjects as methods of making observations and of using them to the best advantage, accuracy of results, computations, errors, the interpretation of data by means of curves, the theory of particular experiments, and other topics as they may occur.

University students having the requisite requirements for admission to course 10 in physics as given in the Courses of Instruction for the year 1915–16 may elect this course, following the schedule prescribed for regular work during the academic year.

One to five three-hour periods a week. Daily except Sat., 10–1. Assistant Professors BLAKER and RICHTMYER, and Mr. POWER. Credit, one to three hours.

14. **Physical Experiments.** Theory and method of physical measurements. The work presupposes a thorough course in elementary physics. It consists of setting up and adjusting apparatus and of performing fundamental experiments; a study of approximations, errors, and methods of computation; and interpretation of results, both analytically and graphically.

The apparatus available renders it possible to make accurate measurements in the different branches of general physics. A few of the subdivisions that may be covered are force, work, power, efficiency, uniformly accelerated linear and angular motions, moments of inertia, coefficients of expansion of solids, liquids, and gases, vapor tension and vapor density, the usual determinations in heat; the study of thermometers, their calibration and comparison, a thorough study of the analytical balance, including a determination of its errors and limitations. In sound, studies may be made in resonance and interference. The work in light comprises a study of lenses, the grating, the adjustment, and the use of the spectrometer, and photometry of various light sources. The equipment in electrical and magnetic apparatus is such as to afford special facilities for the determination of electrical and magnetic constants and for work in electrical measurements such as the measurement of current, electromotive force, resistance, self and mutual induction, capacity, study of the magnetic properties of iron, and the use of standard instruments of a theoretical and a practical nature.

The work, being individual, may be planned to meet the requirements of the student and may cover as many or as few topics as seem desirable. Reports on the work done covering theory and results are to be submitted for criticism. Credit from one to four hours. Prerequisite courses 2 and 7, or 2 and three hours of 10.

One to five three-hour periods a week. Daily except Sat., 10–1. Assistant Professors BLAKER and RICHTMYER, and Mr. POWER.

25. **Advanced Laboratory Practice.** Special laboratory work in physics, open to those students who have had course 14 or its equivalent and who desire to take up special subjects for detailed study, putting much more time on individual problems than is advisable in course 14. It is intended for those teachers who desire at some time to do advanced laboratory work in research, and for teachers in laboratory physics in colleges. Such problems in research as can be completed in the time available may be undertaken by special arrangement.

Among the fields of special interest for which facilities are available may be mentioned: measurement of very low and of very high temperatures; properties of materials at high and low temperatures. Measurement of light and illumination including spectrophotometry, etc.

Credit varies with the amount of work done. The laboratory will be open daily from 10 to 1, excepting Saturday. Directed by members of the staff in each special field.

44. **X-Ray Laboratory.** A special course in X-Ray photography and fluoroscopy will be offered for those qualified for the work. This will include operation of induction coils, transformers, various tubes, measurement of radiation and developing plates. The course is intended for those expecting to operate such apparatus in private or hospital practice as well as for students interested mainly in the physics of Roentgen ray. Plates and paper to be furnished by the student. Hours by appointment. Professor SHEARER.

CHEMISTRY

All courses are given in Morse Hall. L. R. = Lecture Room.

The courses announced below correspond as follows to regular University courses: A to course 1; B to part of 48; C and E to 6; C and D to 7; E (with part of F) to 12; F to 14; FF to 16; G to 17; H to 19; I to 20; J and L to 30; three hours of J and one hour of L to 32; K and M to 31; N to 37; O to 34; R to 65; S to 66; T to part of 69.

The recitation and laboratory work will be arranged, within reasonable limits, to meet the individual requirements of teachers registered in the respective courses. For students wishing to obtain University credit, the requirements for admission to the courses will be the same as during the regular University sessions. For teachers not intending to have their work apply toward a Cornell degree, these requirements will not be rigidly enforced.

A. **Introductory Inorganic Chemistry.** a. Lectures daily except Sat., 12, L. R. 1. Professor BROWNE and Mr. MCCOY. The lectures deal with the fundamental theories and laws of chemistry and with the more common elements and their compounds. They are profusely illustrated by experiments. The course is primarily designed to meet the needs of teachers in secondary schools, and to that end emphasis is laid upon methods of lecture presentation and experimental demonstration. Students other than teachers must, before registering, satisfy the department that they are properly prepared to carry on the work.

b. Laboratory work, M W, 8–12, and T Th F, 9–12. Dr. WELSH and Mr. OVERMAN. A series of experiments designed to illustrate the fundamental laws of chemistry and to acquaint the student with the properties of the principal elements and their compounds. For the benefit of teachers who may take the course especial attention will be given to methods of laboratory instruction, qualitative experiments, and the blowing of simple glass apparatus.

c. Recitations. T Th F, 8. Recitation Room B. Dr. WELSH. The recitations deal with the subject matter of the lectures and with the experimental work in the laboratory; thorough drill in the solution of chemical problems. Credit, six hours.

B. **Selected Topics in Advanced Inorganic Chemistry.** Lectures, M W F, 10, L. R. 4. Credit, one hour. Dr. WELSH. Experimental lectures dealing with various topics in the field of general and inorganic chemistry, and covering some of the more important recent advances.

C. **Qualitative Analysis.** Lectures, M W F, 11, L. R. 4. Dr. LEMON. Laboratory, daily except Sat., 1.30–4.30. Dr. LEMON and Mr. ELLEY. An elementary course for those who have had the equivalent of course A. A study in laboratory and class room of the methods for detecting and separating the principal bases and inorganic acids. This is followed by the analysis of various substances, either in solution or in solid form, the composition of which is unknown to the student. Considerable emphasis is laid upon the writing of equations expressing the reactions involved in the work. Credit, three hours.

D. **Qualitative Analysis.** Lectures and recitations. T Th, 8, L. R. 2. Dr. LEMON. Laboratory work for students, taking courses C and D with the intention of securing the equivalent of the regular University course 7. Daily, except Sat., 1.30–4.30, and M W F, 8–11. For students taking work in course

D alone, afternoon periods only. Dr. LEMON and Mr. ELLEY. Credit, one, two, or three hours. 1. A study in laboratory and class room of the methods of detecting each of the important acids in the presence of the others, together with the reactions involved, followed by the analysis of more complex mixtures than those assigned in course C. 2. A comparative study in the laboratory of different methods of detecting and separating the bases.

E. **Quantitative Analysis.** Elementary. Lectures, T Th, 11, L. R. 4. Laboratory, M W F, 8–11. Credit, two hours. Assistant Professor LUNDELL and Mr. COOLEY.

An introduction to quantitative methods and the chemistry upon which these methods are based. Lectures, explanatory of the methods used, are first given; each student then performs simple analyses which involve the use of the apparatus ordinarily employed in analytical work.

Advanced work (see course F) may be taken by students who complete this course before the close of the session.

F. **Quantitative Analysis.** Advanced. Laboratory practice at hours to be arranged. Credit, one, two, three, or four hours. Assistant Professor LUNDELL and Mr. COOLEY.

This course comprises instruction in certain gravimetric, volumetric, and electrolytic methods of analysis, and in the methods of combustion analysis. The work includes the analysis of iron ores, iron and steel, slags, paints, lubricants, coal and coke, cements and cement materials, alloys, ores of copper, lead, zinc, mercury, manganese, tin, etc.

FF. **Electrochemical Analysis.** Laboratory practice at hours to be arranged. Assistant Professor LUNDELL and Mr. COOLEY.

A study of the most approved electrochemical methods for the determination of silver, lead, copper, tin, nickel, cobalt, and zinc. Practice will be given in the analysis of alloys and ores.

[G. **Opticochemical Methods.** Lectures, daily except S., 12, L. R. 3. Laboratory practice at hours to be arranged. Credit, three hours. Assistant Professor ANDERSON and Mr. ENGELDER.

The lectures deal with the construction and with the use in chemical analysis of the spectroscope, colorimeter, polariscope, and refractometer. The laboratory instruction includes the following work: the observation and mapping of emission spectra of various elements in the Bunsen flame, the oxy-hydrogen flame, the electric arc, and the electric spark; the qualitative analysis of mixtures and minerals with the aid of the Krüss spectroscope and the direct vision spectroscope; the observation and mapping of absorption spectra; the examination and identification of rare earths and of organic dyes in solution, by means of their absorption spectra; the calibration of spectroscopes; spectrum photography with the Hilger wave-length spectrometer and with the Steinheil grating spectrograph; and practice in the use of colorimeters, polariscopes, and refractometers of various types.] Not given in 1915, but will be given in 1916.

H. **Qualitative and Quantitative Gas Analysis.** Lectures, daily except S., 12, L. R. 3. Credit, two hours. Assistant Professor ANDERSON.

A detailed discussion of many representative types of apparatus employed by the gas analyst, and of the various methods of analysis involved in their

use. Numerous simple problems are assigned which afford practice in the calculation and interpretation of the results obtained in gas-analytical work.

I. **Technical Gas Analysis.** Laboratory practice, at hours to be arranged. Credit, two hours. Assistant Professor ANDERSON and Mr. ENGELDER.

The analysis of gas mixtures with the apparatus of Honigmann, Bunte, Orsat, Winkler, and Hempel; the complete analysis of flue gas, illuminating gas, generator gas, acetylene, and air; the determination of the heating power of gaseous, liquids, and solid fuels, and the analysis of various substances by gas analytical methods involving the use of the different types of gas evolution apparatus such as the Scheibler calcimeter, the Hempel, and the Lunge nitrometer, the Lunge gasvolumeter, and the Bodländer gasbaroscope. Within certain limits the work may be selected to suit the requirements of the individual student.

Courses H and I should be taken at the same time.

J. **Organic Chemistry.** Aliphatic compounds. Lectures and recitations. Daily except Sat., 8, L. R. 3. Laboratory practice at hours to be arranged. Credit, three to six hours. Professor ORNDORFF, Mr. MAHOOD, and Mr. KENNEDY.

K. **Organic Chemistry.** Aliphatic compounds. Lectures and recitations. Except Sat., 8, L. R. 3. Credit, three hours. Professor ORNDORFF and Mr. KENNEDY.

These lectures and recitations are the same as those of course J. Course J should be taken in preference to course K whenever it is possible.

L. **Organic Chemistry.** Aromatic compounds. Lectures and recitations. Daily except Sat., 10, L. R. 3. Laboratory practice at hours to be arranged. Credit, one to six hours. Mr. MAHOOD and Mr. KENNEDY.

Courses J and L presuppose a knowledge of elementary chemistry, and L must be preceded or accompanied by J. These courses may be taken together or course J may be taken one summer and course L the following summer.

M. **Organic Chemistry.** Aromatic compounds. Lectures and recitations. Daily except Sat., 10, L. R. 3. Credit, three hours. Mr. MAHOOD and Mr. KENNEDY.

These lectures and recitations are the same as those of course L. Course L should be taken in preference to course M whenever it is possible.

N. **Methods of Organic Analysis.** Laboratory practice with occasional lectures. Hours to be arranged. Credit, two or more hours. Professor ORNDORFF and Mr. MAHOOD.

This course comprises the qualitative and quantitative analysis of pure organic compounds, and of such commercial products as alcohols, ethers, organic acids, glycerol, formalin, acetates, soaps, turpentine, rosin oils, etc.

O. **Advanced Organic Chemistry.** Laboratory practice at hours to be arranged. Credit, two or more hours. Professor ORNDORFF, Mr. MAHOOD and Mr. KENNEDY.

The course in the preparation of organic compounds is here continued, the preparations, however, being more difficult, and requiring more skill and experience on the part of the student.

R. **Microchemical Methods.** Laboratory practice at hours to be arranged. Credit, two hours. Professor CHAMOT.

The aim of this course is to familiarize the student with the use of the microscope and its accessories, and with microchemical methods and apparatus as applied to chemical investigations.

S. **Microchemical Analysis.** Elementary course. Laboratory practice at hours to be arranged. Credit, three hours. Professor CHAMOT.

Practice in the examination and analysis of inorganic substances containing the common elements and acids, with reference to rapid qualitative methods and the analysis of minute amounts of materials.

T. **Elementary Sanitary Chemistry.** Lectures, recitations, and laboratory practice. Credit, five hours. Lectures daily except Sat., 9. Room 89. Recitations and laboratory at hours to be arranged. Dr. REDFIELD.

The course is planned to serve as an introduction to the methods and objects of chemical science as applied to the problems of public health. The work during the Summer Session of 1915 will comprise: elementary water and sewage analysis; commercial disinfectants; common poisons and habit-forming drugs.

Course T is the equivalent of the first term of course 69 given during the regular University session, and presupposes a knowledge of qualitative and quantitative analysis, and of organic chemistry.

[Z. **Teachers' Course.** Lectures and conferences. Lectures T Th, 2, Lecture Room C; conference hours T Th, 3–5 and forenoons by appointment. Not given in 1915.

This course is especially designed to meet the needs of teachers of chemistry in secondary schools. Among the topics considered will be the spirit of the teaching of chemistry in the high school, the adaptation of chemistry to the needs of the pupils; the purpose of experimental work, both as demonstration and as laboratory work; suitable laboratory problems and the equipment adapted to the needs of the modern course in high school chemistry.]

GEOGRAPHY AND GEOLOGY

Illustrated Special Announcement. A special announcement, with many photographic illustrations showing typical features of the Cornell environment and the work of excursion classes in the field is published for the department and may be had, post-free, on application to the Director of the Summer Session. The text of this special announcement is devoted largely to an explanation of the advantages of the Cornell region for outdoor study of both geography and geology, and contains as well full details of the work of the department. As the special announcement was issued in 1914 it should be noted that there are minor changes in some of the courses as listed in the following paragraphs for 1915.

Equipment and Purpose. The lecture rooms and laboratories are in McGraw Hall. It is the purpose in this department to meet, primarily, the needs of teachers in grammar schools, high schools, normal schools, and colleges. A second aim is to provide courses of practical and cultural value to college students. The work embraces lectures, laboratory, and field instruction in physical, regional, and industrial geography; the elements of geology, in mineralogy and lithology.

The environs of Cornell University are rich in phenomena of geographic and geologic interest. Consequently field excursions are made an especially important part of the work of this department in the Summer Session.

The laboratories are well equipped with apparatus and illustrative material for class instruction and research. As such may be enumerated teaching and reference collections of minerals, rocks, fossils, maps, photographs, models, and more than five thousand lantern slides.

For entrance credit (½ unit) in physical geography, a student is required to attend, complete all required work, and pass the examinations in courses A, H, and J.

Special Illustrated Lectures. Each year the department offers several illustrated lectures on geographical or geological subjects of wide popular interest. These lectures are given on Wednesday afternoons in the Geological Lecture Room at 4.35 P. M. The tentative program for 1915 follows:

"Earth History of the Cornell Region," Assistant Professor VON ENGELN, July 7.

This lecture will serve as a general introduction to the scientific appreciation of the scenery around Cornell.

"The Prospect and Peoples of Peru," Professor CARNEY, July 14.

"Some Geographic, Geological and Cultural Aspects of Southern California," Mr. HOOK, July 28.

Round Table Conferences in Geography and Geology. Of especial interest to teachers and supplementary to the regular course work bearing on their problems are one or more Round Table Conferences held during the session. These are led by Professor Carney and consist of informal discussions by all those present of important topics relating to the teaching of geography and geology.

LECTURE AND RECITATION COURSES IN GEOGRAPHY

A. **Physical Geography.** An introductory course in physical geography covering most of the subjects treated in the modern texts, but touching more fully on the general concepts and the theoretical side of the subject than is possible in high school work. Some of the topics treated are the general form of the earth, origin, and distribution of relief features, processes and progress of the physiographic cycle and the resultant development of land forms, configuration of the ocean basins, nature and effects of the continental glaciation, and the bearing of these various phenomena on life relationships. If time permits the meteorological side of the subject will be touched upon, also, but students interested are advised that special courses in meteorology are offered in the College of Agriculture, Summer Session. See announcement of that college.

The lectures in physical geography are fully illustrated by lantern slides, wall and globe maps. Readings will be assigned in Tarr and Martin's "College Physiography." Students registering in this course are advised to take also the related courses, H and J, and if possible E. M T W Th, 9. Geological Lecture Room. Assistant Professor VON ENGELN. Credit, two hours.

B. **Industrial Geography.** After a brief review of the early development of the important industries, a thorough treatment is given the present-day status of the leading industries; agriculture, fishing, mineral, forest, clothing, chemical, and machinery; less consideration is given minor industries and phases of manufacturing. The emphasis is placed on American industries when typical of the group being studied. A particular topic is assigned each member of the class for special study and report. Certain industries are studied at the plants. The lectures are illustrated by lantern slides and collections of specimens.

This course is especially adapted to the needs of teachers of regional, commercial and industrial geography in grammar and high schools. It should if possible be taken in connection with course D, as the two courses will afford the geography teacher many resources for class room work. M T W Th, 8, Geological Lecture Room, with additional time for conferences and excursions to be arranged. Professor CARNEY. Credit, two hours.

C. **Geography of North America.** This course is designed to give teachers of regional geography and others a broad conception of continental evolution and the geographic adaptation of North America for human occupation. The structure, physiographic history, topographic expression, climate, and natural resources of the different geographic provinces are considered in their relation to exploration, development, history, industry, agriculture and to the location and growth of cities and routes of commerce. References and reading assignments to the literature of the subject on particular topics are given attention. The course is fully illustrated with lantern slides, maps, and models.

M T W Th, 10, Geological Lecture Room. Assistant Professor VON ENGELN. Credit, two hours.

D. **Teacher's Course in Geography.** This course provides for the individual needs of each teacher registered; the maps, special literature, and other helps for his or her locality are discussed in personal conference. In the class discussions, consideration is given special topics, including (1) methods of abstracting and filing geographical material found in current periodicals, in government reports, in trade journals, and in municipal publications; (2) how to procure materials for class use; (3) maps and other equipment; (4) geographic conditions operating in the European war; (5) and the application of daily events to the recitations in geography. Each teacher will have an assignment on which to prepare a bibliography, and an opportunity to take part in the discussions.

M T Th, 11, Physical Geography Laboratory. Professor CARNEY. May be taken for one hour credit.

LECTURE AND RECITATION COURSES IN GEOLOGY

E. **Geology.** A general introductory course. Among the topics discussed are: origin of the earth; lithosphere, zone of fracture, and zone of flowage; geological evolution of continents and ocean basins; the significance, areal distribution, and structural features of the great rock groups, as well as the forces modifying them; vulcanism, earthquakes. The geological evolution of life forms; the critical epochs of geologic history, etc. The lectures will be illustrated with lantern slides, models, maps and specimens. Students are urged to take the laboratory course I, also the related courses F and J and if possible course A.

M T W Th, 11, Geological Lecture Room. Mr. MONNETT. Credit, two hours.

F. **Minerals and Rocks.** An elementary course leading to an acquaintance with the properties of minerals, the methods used in mineral identification, and an appreciation of the simpler rock types. Emphasis is laid upon laboratory work to which a large portion of the time will be devoted. About fifty minerals will be studied in detail, the list including those which are more important in the forma-

tion of the rocks of the earth's crust, and others of an economic interest. The latter will be considered especially in connection with their occurrence and important uses. The work on minerals will be followed by a study of the common rocks, including the igneous, sedimentary and metamorphic groups. Ample laboratory facilities provide excellent opportunity for practice in the identification of the various minerals and rocks.

Arrangements may be made with the instructor in charge for the purchase of a set of the minerals and rock specimens for school or private study.

Lectures T Th, 10, General Geology Laboratory. Laboratory practice, W, 2–5, F, 9–12. Mr. HOOK. Credit, two hours.

LABORATORY AND EXCURSION COURSES IN BOTH GEOGRAPHY AND GEOLOGY

H. **Physical Geography, Laboratory Course.** The members of this class will make a systematic study of the Physiographic Regions of the United States using contour maps, models and the experimental laboratory of the department in a laboratory study of the subject. By such study the topographic, regional, and life relationships (human, animal and plant) of the geography of the United States will be correlated and presented as an orderly whole. The course will prove of worth to grade teachers of geography who wish to obtain a broader basis for their work in the subject, as well as for those who expect to teach geography in the high schools.

A laboratory fee of $1.00 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance. T Th, 2–4. Physical Geography Laboratories. Mr. ELSTON. Credit, one hour.

I. **Geology, Laboratory Course.** This course is designed to supplement course E. A study will be made of the more common structural phenomena; of methods of making and interpretation of contoured geological maps; of characteristic life forms developed in different geologic periods; and of the more common materials of the earth's crust. Short field excursions will be made to collect both rock specimens and fossils.

A laboratory fee of $1.00 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

T Th, 2–4, General Geology Laboratory. Mr. MONNETT. Credit, one hour.

J. **Geography and Geology, Field Course.** This course should be elected by all those registering in course A or E, and is required of all those desiring University credit in those courses and also of those who desire entrance credit in physical geography. With courses A and H it affords a comprehensive course in physical geography; with courses E, F and I it will give a similarly broad training in elementary geology, as the dynamic phases of geology are emphasized on the excursions. Mimeographed outlines of the excursions are to be secured by each student desiring credit.

Students not registered in the course or department are invited to attend these excursions but must conform to the directions of those in charge. Those desiring University or entrance credit must take field notes and hand in written reports. Excursions 1–6 are required of all students in the course, and in addition they must make either two of 7, 8 and 9; or one of 10 and 11 for one hour's credit.

Meeting place and time announced in mimeographed outlines or by bulletin. Meet for first excursion Monday, July 5th, (1915) at Geological Lecture Room, McGraw Hall, 2.30 p. m. Excursions 1–6, Monday afternoons; 8, 9, all day Saturday; 7, 10 and 11 Friday and Saturday. On the excursions to which a cost is attached persons wishing to go must register at the department and secure tickets in advance of the date of the trip.

The longer excursions will be under the general charge of Assistant Professor von Engeln with the co-operation and assistance of the other members of the instructing staff. On the excursions stops will be made at points of interest, explanations made, questions asked and discussion invited.

OUTLINE OF EXCURSIONS—Course J

Monday Afternoons

1. **Campus and Vicinity.** To study the action of streams and the progress and form of valley development. Visiting Alumni Field, upper Cascadilla Gorge, and Goldwin Smith Walk. July 5.

2. **Eagle Hill.** To become acquainted with the lay of the land about Cornell, to learn the place names of the broader physiographic features, studying, enroute, processes of weathering, and, at the summit, the maturely dissected plateau. The top of the hill is a vantage point from which a good view of the lake and the land for miles to the north, east, and west may be had. July 12.

3. **Fall Creek and Deadhead Hill.** To study the origin and nature of sedimentary rocks, also processes of erosion, transportation, deposition and cementation. An intimate view of one of the large gorges and its especial features, particularly Ithaca Falls. July 19.

4. **Shore of Cayuga Lake.** To study shore line phenomena, joint planes, bedding and stalactite formation. A walk for several miles along the east shore of the Lake. Probably return by trolley, if so, expense $.15 to $.20 may be paid at the time. July 26.

5. **Terminal Moraine. North Spencer.** By train. Expense about $.75. Probably leave lower Lehigh Station at 1.35 p. m., return 5.38 p. m. To study a massive morainic loop, the basin in which the former ice tongue rested and the outwash deposits and overflow channels to the south. Truncated valley sides due to glacial erosion. The most striking examples of glacial phenomena in the Cornell Region. Aug. 2.

6. **Six Mile Creek.** To study the effect of glaciation on a stream course. Relations to water supply and power development. A climb into and walk through one of the gorges in Six Mile Creek and an interpretation of its complicated physiographic history. Aug. 9.

All-Day Excursions

7. **Cayuga Lake, Taughannock Gorge and Falls.** By boat. Expense about $.75. To study the Inlet Plain, its reclamation, the Barge Canal terminal, the position and succession of the Devonian strata along the lake shore and the deep gorge and falls of Taughannock. A sail along the west shore of the lake and a walk through the great gorge to Taughannock Falls, one of the highest straight

falls east of the Rockies. Luncheon at the base of the falls. July 9, repeated July 10.

8. **Enfield Gorge and Falls.** By wagon. Expense about $1.10. To study the relations of preglacial and hanging valleys and the post glacial and interglacial gorges, their origin and features. Joint plane guidance of stream courses. A ride to the head of the gorge, climb through it to the crest of Lucifer Falls. Enfield is perhaps the most picturesque and wildest of the gorges in the Cornell Region. July 24.

9. Two distinct and separate excursions constitute No. 9:

A—Freeville. By wagon. Primarily for geography students.

B—Union Springs. By boat. Primarily for geology students.

These two excursions may need to be conducted on the same day, but it is usually possible to go to Freeville on Friday and to Union Springs on the Saturday following. Aug. 6 and 7.

A—Freeville. Expense about $1.10. To study the mature upper Fall Creek valley and its glacial deposits primarily those due to outwash from the melting ice and to note the bearing of these on agriculture. A drive along the course of Fall Creek. In the afternoon a visit is usually made to the George Junior Republic. In charge of Professor Carney.

B—Union Springs. Expense about $1.10. To study the Silurian and Devonian rock exposures along the shores of Lake Cayuga; collection and interpretation of fossils from the various horizons and a study of the stratigraphy in its relation to economic geology. In charge of Messrs. MONNETT and HOOK.

Longer Excursions

10. **Niagara Falls and Gorge.** By special train and trolley cars. Expense between $8.00 and $10.00. Over night at Niagara Falls. July 31.

All the important scenic features of Niagara Falls and Gorge are visited and their physiographic history interpreted. As a whole these phenomena constitute a striking record of some of the most interesting chapters in the geologic and physiographic history of North America. Before the trip a special meeting of those interested will be held in the Physical Geography Laboratory when the relations of the different places will be explained and illustrated by large scale relief model of the Niagara Region. Students are advised to send to Director, U. S. Geological Survey, Washington, D. C., for a copy of Niagara Folio, No. 190, in octavo form, cost $.50 in coin or money order.

There may be opportunity for such part of the class as is interested primarily in industrial and commercial geography to see something of the power development at Niagara and for the stratigraphic geologist to collect fossils from the great Niagara Gorge section but the main portion of the class will devote its attention to the dynamic geology and physiographic interest of the region.

11. **Watkins Glen.** By special train. Expense about $2.00. July 17.

Watkins Glen is considered one of the most beautiful in the country. It has been secured for a state park by New York and all parts of it made accessible. The excursion party will study the gorge, its pot holes and falls in detail; and consider its relations to the Seneca Lake Valley in comparison with the conditions at Ithaca as referred to the Cayuga valley. Train ride across the dissected upland country to the south and west between Ithaca and Watkins.

ZOOLOGY

A. **General Zoology.** An elementary course designed to meet the needs of teachers and those wishing to gain a general knowledge of the subject. The earlier part of the course aims at familiarity with the fundamental principles of animal functions and morphology. In addition the course deals with a comparative study of development and structure, systematic position, habits, and life-histories of animals. The laboratory periods will be devoted to a study of their form and structure. As far as possible every phase of the subject will be illustrated by a study of the living animal. Lectures, daily except Sat., 9. McGraw Hall, Room 5. Five laboratory periods, daily except Sat., 2–5.30. Laboratory fee, $5.00. Credit, five hours. Assistant Professor REED, and Mr. DENNEY.

B. **Ornithology.** A course concerned with the various phases of bird life. The lectures will discuss such subjects as migration, coloration, molt, habits, nests, eggs, care of young, structure and toponomy, flight, general bird-ecology and ecological groups, bird photography, preparation of study material, economic importance, methods of attracting birds, protection, game propagation and conservation, and geographical distribution. The aim of the field work is the identification of birds in their haunts and observations upon habits. Representatives of the important families of North American birds will be studied in the laboratory with the aid of a manual. Each student should be provided with Chapman's Handbook of Birds of Eastern North America and with field or opera glasses.

Lectures, T Th, 11, McGraw Hall, Room 5. Laboratory is open, daily except Sat., 2–5. Field work in two sections. Credit, three hours for lectures, and two laboratory and two field periods of two and one-half hours each. The lectures may be taken separately or any combination may be made according to the needs of the student. Laboratory fee, $1.50. Dr. ALLEN.

C. **Advanced Work.** An opportunity for advanced work and research is offered to those who are qualified. The laboratory will be open from 8 to 5 daily except Saturday. Assistant Professor REED and Dr. ALLEN.

SHOP WORK AND DRAWING FOR ENGINEERING STUDENTS

Drawing

For further information regarding course C, apply to Professor Pond; for information regarding the drawing and shop courses apply to Professor Kimball, 205 Sibley.

A. **Mechanical Drawing.** A course in drawing for beginners, covering use of instruments, orthographic and isometric projection, inking, tracing, conventions, working drawings, M W F, 8–11 and daily except Sat., 2–5. Sibley 203. Assistant Professor HAM.

B. **Machine Sketching and Drawing.** A more advanced course in mechanical drawing for those who have had the equivalent of course A. Sketching of machine parts, machine drawing from sketches, empirical design. This course is an application of the work in course A to such machine designing as can be done without a knowledge of mechanics. M W F, 8–11 and daily except Sat., 2–5. Sibley 203. Professors KIMBALL and HAM.

C. **Descriptive Geometry.** Lectures or recitations, daily except Sat., 8. Drawing daily except Sat., 9–12. Lincoln Hall. Assistant Professor POND.

A study of the representation of lines, planes, surfaces, and solids, and their interrelations. Warped surfaces. Tangencies. Intersections, shades and shadows, and perspective. The work is the same as is given in the regular C.E. course 1, and the student will receive five hours credit if he takes the whole course. A three hour course that does not include shades and shadows, and perspective and fulfills the requirements for the Mechanical Engineering students of Sibley College will also be given. The latter will be given from 2–5 p. m. if there are students enough to make up an extra section.

Shop Work

A. **Pattern Making.** Use of woodworking tools; elements of pattern making. Mr. HOOPER.

B. **Foundry Work.** Moulding, casting, mixing of metals, operation of cupola, etc. Mr. VANDERHOEF.

C. **Forge Work.** Forging, welding, tempering, etc. Mr. HEAD.

This course will be given only if the registration is large enough to warrant it.

D. **Machine Work.** Use of measuring tools; hand and machine tools; fitting and assembling.

Each of the above daily except Sat., 8–11, 1–5, and Sat., 8–11. Mr. WELLS and Mr. BUCK.

E. **Manual Training.** The scope of the foregoing courses in shop work is the same as that of the corresponding courses given to the regular Sibley College students. They are intended for prospective or actual engineering students. In addition to these, special courses are offered in each shop, designed to meet the wants of manual training teachers, and given in close connection with the technical work of manual training. (See pp. 18, 19). Teachers having special needs may have courses laid out to suit their wants. At the same time it is greatly to their advantage to see the work as given to the regular engineering students.

MECHANICS OF ENGINEERING

The courses in mechanics given in the Summer Session are designed primarily for those students in Cornell University who have taken mechanics in regular University classes in the College of Civil Engineering or in Sibley College but who have received a condition therein (that is a mark of 41–59). Students other than those mentioned above must satisfy the professor in charge that they are qualified to take the work before they can be registered in these courses. The courses A and B are considered the equivalent of course 20 in the College of Civil Engineering, or of courses M 5 and M 6 in Sibley College.

Textbooks: Church's Mechanics of Engineering, and Notes and Examples in Mechanics, supplemented by other printed notes and problems.

A. **Mechanics.** Statics of a material point and of rigid bodies. Centers of gravity. Chains and cords. Dynamics (kinetics) of a material point. Centrifugal and centripetal forces. Moments of inertia of plane figures and of rigid bodies. Dynamics (kinetics) of rigid bodies. Work. Power. Energy.

Lectures, recitations, and problems, two hours daily, 8–10. Credit, five hours. Lincoln Hall 24. Assistant Professor RETTGER.

B. **Mechanics.** Friction; graphical statics of structures and mechanisms; stress and strain; strength and elastic properties of materials in tension, compression, and shearing; torsion; bending moment, safe loading, deflection and resilience in simple and continuous beams.

Lectures, recitations, and problems, two hours daily, 10–12. Credit, five hours. Lincoln Hall 24. Assistant Professor RETTGER.

BRIDGE AND STRUCTURAL ENGINEERING

C.E. 71. **Structural Design and Bridge Stresses.** Credit, two or four hours. Prerequisite Mechanics 20. One-half of the course includes structural details, i. e., the design of a wooden roof truss and of other timber joints. The other half of the course includes dead load, live load, wind load, and impact stresses in simple bridge trusses due to uniform live panel loads, locomotive axle loads, and road roller loads. This course is equivalent to first term C.E. 71. Lectures, recitations, computations, and drawing at hours to be assigned. Lincoln Hall 22 and 29. Messrs. BURROWS and URQUHART.

C.E. 71. **Bridge Design.** Credit, four hours. Prerequisites Structural Design and Bridge Stresses. Computations and drawing for the complete design of a riveted railroad bridge truss, the stresses for which were computed in connection with the previous work in Bridge Stresses. The computations to determine the sections of all members, of pins, pin plates, splices, and other details as well as of connecting rivets are to be written up in the form of systematically arranged reports. The drawings consist of general detail plans showing the location of all rivets as well as the composition and relations of all members and connections. The final report is to give a full list of shapes and plates and a classified analysis of weights for the span. Lectures, computations, and drawing at hours to be assigned. Lincoln Hall 14 and 22. Messrs. BURROWS and URQUHART.

C.E. 72. **Reinforced Concrete Arch.** Credit, three hours. Prerequisites Mechanics 20, and that portion of course 71 which deals with elementary graphic statics. The design of an arch of reinforced concrete including the abutments and centering. Lectures, computation, and drawing, at hours to be assigned. Lincoln Hall 14. Messrs. BURROWS and URQUHART.

This course may be substituted for Engineering Design, C.E. (91f).

C.E. 77. **Concrete Construction.** Credit, three hours. Prerequisite Mechanics 20. Textbook, Principles of Reinforced Concrete Construction by Turneaure and Maurer. The object of this course is the study of the fundamental principles underlying the rational design of reinforced concrete structures including centering. Recitations, computations, and drawing at hours to be assigned. Lincoln Hall 14 and 29. Messrs. BURROWS and URQUHART.

HYDRAULICS

The instruction in theoretical hydraulics given in the Summer Session covers the same field as the regular course, C.E. 23, required of all juniors in the Col-

lege of Civil Engineering, except that no laboratory demonstration lectures are given. It is intended as a course in systematic tutoring for students in Civil Engineering who have attended the course during both first and second terms and have failed to attain a passing mark in either term's work. Full University credit can not be given to such persons for work in the Summer Session, except as noted below.

As arranged for the summer schedule, the work of the fall term is covered fully by the classes meeting each morning at 8 o'clock (six times a week), and the second term's work is covered by the class meeting from 12 to 1 daily except Saturday.

Students in Sibley College, desiring credit for the equivalent of course M 12 (2 hours credit), may, with the sanction of the Committee on Summer School Studies of Sibley College, arrange to take work of the same scope as the Sibley Course as follows: From July 6 to 25 from 8 to 9 a. m. daily, and from July 13 to July 31 from 12 to 1 o'clock daily except Saturday.

Registration for the Summer Session in hydraulics should be made with Professor F. J. Seery, 33b Lincoln, preferably before the close of the spring term, or by letter.

Course A. Hydrostatics; measurement of pressures; strength of pipes; dams and retaining walls; earth pressures; immersion and flotation; pneumatics of air motors and compressors; barometric levelling; hydraulic motors and flow of water through pipes and orifices and over weirs; fluid friction and loss of head; general application of Bernouilli's Theorem, etc. Daily except Sat., 12. Lincoln 21. Assistant Professor SEERY.

Course B. Steady flow in open channels; use of Kutter's and Church's Diagrams; hydraulics of machinery; waterwheels; impulse wheels; reaction turbines; theorem of flow through rotating casing; power, speed, and discharge of turbines; to theory of testing motors, etc. Daily, 8. Lincoln 21. Assistant Professor SEERY.

STATE COLLEGE OF AGRICULTURE

George Alan Works, B.Ph., M.S.A, in charge of Summer Session in College of Agriculture.

STAFF OF INSTRUCTION

F. E. Andrews, Foreman of instruction flocks in Poultry Husbandry. Poultry Husbandry

Elmer Eugene Barker, A.B., Ph.D., Assistant Professor of Plant Breeding. Plant Breeding

Beulah Blackmore, Instructor in Home Economics. Home Economics

H. P. Buchan, Foreman Incubation and Brooding. Poultry Husbandry

Harry Oliver Buckman, M.S.A., Ph.D., Assistant Professor of Soil Technology. Soils

George Walter Cavanaugh, B.S., Professor of Chemistry in its Relations to Agriculture. Chemistry

Thomas Burr Charles, B.S., Assistant in Poultry Husbandry. Poultry Husbandry

Charles Chupp, A.B., Instructor in Plant Pathology Plant Pathology

Mrs. Anna Botsford Comstock, B.S., Assistant Professor of Nature Study. Nature Study

Ralph Wright Curtis, M.S.A., Assistant Professor of Landscape Art. Landscape Art

Archie Byron Dann, B.S., Instructor in Poultry Husbandry. Poultry Husbandry

Oliver Wesley Dynes, M.S. in Agriculture, Instructor in Farm Crops. Farm Crops

George Charles Embody, Ph.D., Assistant Professor of Aquiculture. Natural History

J. H. Faull, Ph.D., Professor of Botany in University of Toronto. Botany

James G. Halpin, B.S., Professor of Poultry Husbandry, University of Wisconsin. Poultry Husbandry

Merritt Wesley Harper, M.S., Professor of Animal Husbandry Animal Husbandry

L. A. Hausman, B.S., Assistant in Meteorology. Meteorology

Layton S. Hawkins, B.A., Specialist in Agricultural Education, Lecturer in Rural Education.

Mary Henry, B.S., Instructor in Home Economics. Home Economics

Oskar Augustus Johannsen, A.M., Ph.D., Professor of General Biology. Biology

Olney Brown Kent, B.S., Instructor in Poultry Husbandry. Poultry Husbandry

Helen Knowlton, A.B., Instructor in Home Economics. Home Economics

Lewis Knudson, B.S.A., Ph.D., Assistant Professor of Botany. Botany

George Nieman Lauman, B.S.A., Professor of Rural Economy. Rural Economy

David Lumsden, Assistant Professor of Floriculture. Floriculture

Lawrence Howlands MacDaniels, A.B., Instructor in Botany. Botany

Albert Russell Mann, B.S.A., Secretary to the College of Agriculture.

Alice Gertrude McCloskey, A.B., Assistant Professor of Rural Education. Rural Education

Thomas Joseph McInerney, M.S. in Agriculture, Instructor and Investigator in Dairy Industry. Dairy Industry

Richard Alan Mordoff, B.S. in Agriculture, Assistant Registrar.
Winifred Moses, B.S., Instructor in Home Economics. Home Economics
Earl Long Overholser, M.S.A., Instructor in Pomology. Pomology
Roland Harrison Patch, B.S., Instructor in Floriculture. Floriculture
Frank Elmore Rice, A.B., Instructor in Agricultural Chemistry. Chemistry
James Edward Rice, B.S.A., Professor of Poultry Husbandry. Poultry Husbandry
Howard Waite Riley, M.E., Professor of Rural Engineering. Rural Engineering
Francis Elton Rogers, B.S., Instructor in Pomology. Pomology
Flora Rose, B.S., M.A., Professor of Home Economics. Home Economics
Harold Ellis Ross, M.S.A., Professor of Dairy Industry. Dairy Industry
Elmer Seth Savage, M.S.A., Ph.D., Professor of Animal Husbandry. Animal Husbandry
Harold Allen Severy, A.B., A.M., Assistant in Botany. Botany
Samuel Newton Spring, B.A., M.F., Professor of Forestry. Forestry
Clark Leonard Thayer, B.Sc., Assistant in Floriculture. Floriculture
Arthur Lee Thompson, M.S. in Agriculture, Assistant Professor of Farm Management. Farm Management
Martha Van Rensselaer, A.B., Professor of Home Economics. Home Economics
Herbert Hice Whetzel, A.B., M.A., Professor of Plant Pathology. Plant Pathology
Karl McKay Wiegand, Ph.D., Professor of Botany. Botany
Charles Scoon Wilson, A.B., M.S.A., Professor of Pomology. Pomology
George Alan Works, B.Ph., M.S.A., Professor of Rural Education. Rural Education
Paul Work, A.B., M.S.A., Superintendent of the Department and Instructor in Vegetable Gardening. Vegetable Gardening

COURSES IN THE COLLEGE OF AGRICULTURE

The New York State College of Agriculture provides the following courses of instruction under the rules and regulations that follow:

1. **Admission.** There is no examination for admission, but applicants must satisfy the instructor in charge of any course which he seeks to enter that he is qualified to pursue the work of the course.

2. **Attendance and Registration.** Students must conform to the regulations on page 6. At 2.30 P. M. July 5, a general assembly of students will be held in room 133, Roberts Hall, College of Agriculture, at which time explanations regarding the work for the Summer Session will be made, and students will be given an opportunity to confer with faculty members regarding courses. Preferably study cards should not be filed with the secretary in room 192, Roberts Building, College of Agriculture, until immediately after the assembly. Professor George A. Works in charge of the Summer Session in the College of Agriculture, will be in room 294, Soil Technology Building, daily, to assist those who may desire help with their programs, after July 1.

3. **Tuition and Fees.** Tuition in any of the courses following is free to residents of New York State, and to students registered in the Graduate School for graduate work in Agriculture only. All others will pay a tuition fee of $30 whether one subject or more be taken. For the time and place of payment, see page 7.

In some of the courses a fee to cover the cost of materials used will be charged.

Fee cards must be procured from the instructor at the first exercise, and returned to him receipted within five days.

4. **Academic Credit for Work.** For the requirements for the degree B.S. (8 terms, 120 hours, etc.) see the Announcement of the College of Agriculture. For graduate work, see page 8.

ANIMAL HUSBANDRY

A. **Principles and Practice of Feeding Animals.** Credit, two hours. Lectures, M W F, 10. Practice, T Th, 10–12.30. Animal Husbandry Building. Professor SAVAGE.

The general principles of animal nutrition, based on Jordan's Principles of Human Nutrition as a text. The discussion of these principles will occupy most of the time given to lectures. The practice of feeding animals, based on Henry's Feeds and Feeding as a text. The discussion of the practice of feeding horses, cattle, sheep and swine, will occupy most of the time given to laboratory work, which will also include the study of feeding standards, the study of about forty home-grown and commercial feeds, the formulation of rations, and the like.

B. **Principles of Animal Breeding, and Elementary Judging.** Credit, three hours. Lectures, daily except S, 9. Laboratory, T Th, 2–4.30. Animal Husbandry Building. Professor HARPER.

A general discussion of the principles of heredity as applied to the breeding of animals, with a study of animal form; origin and formation of breeds; crossing

and grading, with an outline of the methods of registration and the study of records and pedigrees. Demonstrations, essays, and reports will be required in addition to the lectures.

The laboratory work will include practical handling of animals, and methods of scoring and judging. Types and several breeds, particularly of dairy cattle, will be illustrated.

BIOLOGY

A. **General Biology.** Credit, three hours. Lectures, daily except S, 11. Roberts Hall 392. Laboratory and field work, sec. A, M W F, 2–4.30; sec. B, T Th, 2–4.30, S, 8–10.30. Main Building 302. Assistant Professor JOHANNSEN and Mr. ———.

This is an elementary course designed to acquaint the general student and the prospective teacher with the principal ideas of biology through selected practical studies of the phenomena on which biological principles are based. Laboratory fee, $2.50.

B. **Insect Life.** Credit, two hours. Lectures, T Th, 8. Practical exercises T Th and F, 2–4:30. Roberts Hall 391. Miss STRYKE and ———.

H. **Aquiculture.** Credit, one hour. Lectures T Th, 9. Roberts Hall 392. Assistant Professor EMBODY.

A series of lectures relating to the propagation of fishes and other useful aquatic organisms, and the conservation of our aquatic resources.

BOTANY

The courses in botany are planned to meet the needs of high school and college teachers, as well as to furnish information for persons not intending to teach.

The work will consist of lectures, laboratory work, and field work. The lecture and classroom work will be supplemented by lantern slides, charts, microscopes, slides, museum and herbarium material. It is likely that some round-table discussions will be arranged.

The region about Ithaca is especially rich in plant life. Rarely, if ever, is a locality found that is better adapted for summer field work in botany. The richness of the fungous and the algal floras, as well as the great number of mosses, liverworts, ferns, and flowering plants, render field work here especially attractive and valuable. Special attention is given to the field botany, although other phases of the work are not ignored.

The country in the vicinity of the University is very diversified, marshes, fields, woodlands, ravines, and bogs all being accessible for day trips. Many short field trips will be taken and three longer all-day trips. Each student in Course A, B, D, E, and H is expected to take at least two of the three all-day trips. The all-day trips will occur on Saturdays and will entail an extra expense of 50 cents to $1.50 for each; one of the trips will cost $2.50.

Some of the excursions will be in rough and wild localities, and clothing suitable for such trips should be provided. Women are strongly advised to wear the bloomer costume. During recent years this costume has been very generally

worn for such work. For one trip indeed, which however is not definitely required the bloomer costume is really a necessity.

A. **Elementary Botany.** Credit, three hours. Lectures, M W, 8. Laboratory, M W, 9–1, F, 8–1 with additional reading or field work. Botanical Laboratory, Agronomy Building. Professor FAULL and Mr. SEVERY.

Representative plants from all the larger plant groups will be studied. Emphasis will be placed on structure and life history, with particular attention to evolutionary relationship. Some attention will be given to the economic aspects of the different groups, and to their adaptation to surroundings. Field work will replace laboratory hours to a limited extent and some all-day trips will be required.

This is a general course planned as an introduction to the study of botany and as a preparation for advanced courses. It is intended also to cover certain phases of college entrance requirements and of general secondary school botany. Laboratory fee, $2.50.

B. **Elementary Morphology of Seed Plants.** Credit, one hour. Lectures T, 2–3. Laboratory, T, 3–5.30, Th, 2–4.30, with some additional reading. Botanical Laboratory, Agronomy Building. Professor FAULL and Mr. SEVERY.

A study of the variation in form and structure of roots, stems, leaves, flowers, fruits, and seeds, together with the terminology concerned, and the advantages of these variations. Modified plant parts, pollination, and seed dissemination will receive attention. Fundamental internal structure will be briefly treated. Laboratory and field studies, conferences, recitations, and reading.

The course is arranged somewhat after the plan of Gray's Lessons in Botany, and is designed as a preparation for systematic field botany and for persons desiring a general knowledge of the common plants. It also covers certain phases of a secondary school botany. Identification is not a feature of this course. Laboratory fee, $1.

C. **General Plant Physiology.** Credit, four hours. Prerequisites: all freshman work or its equivalent, and general botany. Lectures, daily except S, 9. Laboratory, daily except S, 10–1.30. Agronomy Building. Assistant Professor KNUDSON.

Lectures, recitations, laboratory work, reports, and occasional field studies. Topics include absorption, conduction, transpiration, metabolism, relation to environment, growth, reproduction, and propagative processes. Laboratory fee, $5.

D. **Identification, Classification, and Ecology of the Higher Plants.** Credit, two hours. Prerequisite: some training in structural botany, taken previously or in connection with this course. Lectures, T, 8. Laboratory or field, T, 9–1, Th, 8–1. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Mr. MACDANIELS.

A comprehensive study of the wild flora about Ithaca, with reference to the practical recognition of species and varieties as well as to the floral and foliar characteristics of these species and to the grouping of them into genera, families, and more comprehensive groups. The course consists of field and laboratory work, but is supplemented by general discussions and lectures on the broader question, of classification, nomenclature, distribution, and habitat. The ecological associations and modifications of the various species and varieties will be noted.

The course is intended to supply teachers and others with a general knowledge of the flora. Some all-day trips are required. Supplementary instruction will be given in the preservation of material for the museum and for the herbarium.

If necessary this course will be divided as follows: A. For those beginning this type of work. B. For students who already possess some knowledge of the flora. Laboratory fee, $1.50.

E. **Trees and Shrubs.** Credit, two hours. Prerequisite: some training in structural botany, taken previously or in conjunction with this course. Hours by appointment. Agronomy Building. Professor WIEGAND and Mr. MACDANIELS.

A course intended for those who desire more concentrated work on the woody plants of our flora than can be obtained in course D. The aim is to familiarize the student with as many as possible of the trees and shrubs in the Cayuga Lake flora, their floral and foliar characters, their structure, methods of growth, habits, distribution, and classification. Much of the work will be in the field, supplemented by laboratory practice, lectures and demonstrations. Some all-day trips are required. Laboratory fee, $1.50.

G. **Research for Graduate Students.** (For students counting the Summer Session as residence toward an advanced degree.) Professor WIEGAND.

Graduate students are advised to register in the Summer Term of the College of Agriculture, but in case this is impossible they may register in this course.

H. **Identification and Classification of Lichens, Liverworts, Mosses and Ferns.** Credit, one hour. Prerequisite: a general knowledge of structural botany. Laboratory and field work, M W, 2–5, with some additional work by appointment. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Assistants.

An introduction to the four groups of plants indicated by the title of the course. The student will become acquainted with the general structural characteristics of different members of these groups, and will receive practice in tracing the various species through the keys. The field work is planned to acquaint students with the flora of our ravines and swamps, which is especially rich in lichens, liverworts, mosses and ferns. Material will be collected, identified, mounted in standard packets and will become the property of the student. Some all-day trips are required. Laboratory fee, $1.

CHEMISTRY

A. **Agricultural Chemistry.** Credit, four hours. Prerequisite: Chemistry 1, or its equivalent. Lectures, daily, 8. Morse Lecture Room 1. Recitations, M W F, 9. Morse Hall. Professor CAVANAUGH.

A general course treating of the relations of chemistry to agriculture. The following are among the subjects discussed: the chemical composition of agricultural plants and plant by-products; the chemical composition of soils; some chemical relations between the organic and the inorganic matter of soils; sources, preparation and manufacture of the materials used in fertilizers; the chemical relations of lime to soils; the chemistry of insecticides and fungicides.

B. **Agricultural Chemistry.** Credit, two hours. Prerequisite Chemistry 1 and 6, or the equivalent. T Th, 2–5; F, 10–1; S, 9–12.30. Professor CAVANAUGH and Mr. RICE. Quantitative Laboratory, Morse Hall.

A laboratory course designed to accompany course A. Laboratory deposit, $15.

C. **Household Chemistry.** Credit, two hours. Prerequisites: Chemistry 1 and 6, or the equivalent. Lectures, daily except S, 10. Morse lecture room 3. Professor CAVANAUGH.

This course is designed especially for students in home economics. It treats of the chemistry of foods, beverages, baking chemicals, preservatives, and detergents.

D. **Household Chemistry.** Credit, three hours. T W Th F, 2–5; F, 11–1; S, 8–1. Quantitative Laboratory, Morse Hall. Professor CAVANAUGH and Mr. RICE.

A laboratory course designed to accompany course C. Laboratory deposit, $20.

DAIRY INDUSTRY

A. **Milk Composition and Tests.** Credit, three hours. Lectures, M W F, 8. Recitations, T Th F, 9. Dairy Building 222. Laboratory, M W F, 2–4.30. Dairy Building 232. Professor Ross and Mr. MCINERNEY.

This is equivalent to course 1 of the regular university year. The topics considered are the secretion and composition of milk, sampling, the use of the lactometer, the Babcock test for fat, acid tests, moisture tests, salt tests, tests for preservatives and adulterations. Laboratory deposit, $3.

B. **Dairy Industry.** Five periods. Credit, two hours. Lectures, T Th, 10. Dairy Building 222. Laboratory, M W F, 10–1. Dairy Building 122. Professor Ross and Mr. MCINERNEY.

Students who take this course and later take regular courses of the department covering work treated in this course will need to have credit adjusted.

This is a general course in dairy work covering the outline as given in the State Syllabus. It should be of value to teachers of dairy work in high schools. The course includes lectures and laboratory work in the following topics: nature of bacteria and their relation to dairy products; sources of bacterial contamination.

FARM CROPS

A. **Farm Crops.** Credit, three hours. Lectures, daily, 9. Laboratory, M W, 2–4.30. Agronomy Building 202. Dr. DYNES.

A course covering the principal cereal and forage crops. The subject matter presented will be chosen especially to meet the needs of teachers of agriculture in high schools. Laboratory fee, $2.

FARM MANAGEMENT

Farm Management. Four periods. No credit towards graduation. Lectures, T Th S, 9. Laboratory W or Th, 2–4.30. On days when farms are visited laboratory work may last longer than two and one-half hours. Farm Management Building. Assistant Professor THOMPSON.

A general course planned for teachers in Agricultural High Schools. Among the subjects discussed are farming as a business; labor income, size, diversity and production of business; regions and types of farming; cropping systems;

farm layout, efficient use of labor, horses, and machinery; choosing and buying a farm. Laboratory fee, $1.

FORESTRY

B. **General Forestry.** Credit, two hours. Lectures, M T W F, 8. Forestry Building 210. Field work, F, 2–4.30. Professor SPRING.

This course covers briefly the general field of forestry. Its principal phases are exemplified in field excursions. The topics to be considered will include the principles and general methods of forestry; forest resources; the influence of the forest on stream flow and on climate; how to reproduce the forest and to maintain timber production; important phases of federal, state, and private forestry. Laboratory fee, 50 cents.

FLORICULTURE

1. **Garden Flowers.** Credit, one hour. Lectures, T Th, 9. Laboratory, F, 2–4.30. Greenhouses. Professor LUMSDEN and Mr. THAYER.

This is designed as an elementary course to be of value for home flower garden or school garden work. It is outlined so as to acquaint students with the most valuable material for this line of work, and to cover methods of propagation and culture.

Lectures and Garden Practice

11. **Indoor Flower Growing.** Credit, one hour. Lectures, M W, 10; Laboratory, S, 8–10.30. Greenhouses. Mr. PATCH.

The propagation and culture of plants suitable for winter gardens in school rooms, including a study of containers, soils, fertilizers, insecticides, is the basis of this course. The selection of varieties of bulbs and their methods of culture indoors, is also considered, as is also the method of propagation and general care of species of plants suited for indoor culture.

HOME ECONOMICS

The work is intended for persons desiring to teach, but is suited to others desiring to study, the principles of home making.

A. **Foods.** Credit, four hours. Lectures and recitations, daily except S, 12. Home Economics Building 245. Laboratory practice, daily except S, 2–5 or 8–11. Home Economics Building 200. Written review for those wishing credit in this course S, 12. Misses KNOWLTON, HENRY and MOSES.

A course for establishing a fundamental knowledge of foods. The lectures will include a discussion of the sources, composition, and characteristics of foodstuffs; principles governing the selection of foods and methods of preparing them; food preparation and preservation; table-setting and serving; comparative nutritive values and cost of various foods. The laboratory work will follow the lectures closely, and will consist of experiments in determining the characteristics of food stuffs and practical problems in the preparation of food for the table. Laboratory fee, $5.

B. **Human Nutrition.** Credit, three hours. Lectures and recitations, daily except S, 11. Home Economics Building 100. Laboratory practice, T Th, 2–

5:30. Home Economics Building 200. Written reviews for those wishing credit in the course S, 11. Professor ROSE and Miss HENRY.

This course will include discussion of the fundamental principles of nutrition as these apply to the human being; the practical means of applying scientific principles in planning dietaries; special problems of nutrition, as the feeding of infants and children. The laboratory work will consist of exercises in determining the comparative cost and nutritive value of various foods; in planning and judging various types of dietaries; in preparing typical means. Open only to students who have had course A or its equivalent. Laboratory fee, $4.

C. **Household Management.** Credit, two hours. Lectures, daily except S, 8. Home Economics Building 100. Home Economics Building 400. Written reviews for those desiring credit in the course S, 8. Professor VAN RENSSELAER.

Lectures will discuss division of income, household accounts, factors in cost of living from the housekeeper's standpoint, domestic service, household equipment, means for saving labor and general management of the house.

D. **Household Sanitation.** Credit, one hour. Lectures and recitations, M W F, 9. Home Economics Building 100. Various lecturers.

Household bacteriology; cleanliness of soil, air, water, food; disposal waste; insect pests, infection, immunity, methods of disinfection; good housekeeping in relation to public health; healthful living to promote efficiency; physical exercise and rest.

E. **Extension in Home Economics.** Credit, three hours. Lectures, M W F, 10. Home Economics Building 105. Laboratory, T Th S, 9–11. Home Economics Building 265. Professor VAN RENSSELAER and others. Laboratory fee $1. In certain cases there will be the expense of travel to nearby places.

This course is offered to meet a growing need for trained extension workers. It is planned especially for those persons who already have knowledge of home economic subjects to extend and who wish to familiarize themselves with channels through which extension work may be carried and methods of extension teaching.

Other persons may be admitted to this course, however, if they can show special qualifications which will adapt them to extension work. Such students must however choose some special subject-matter courses in home economics to be taken simultaneously with course E.

The person having had previous training in home economics may also find it an advantage to take such courses to constitute a review of subject matter.

The following combinations are suggested to constitute a full program: Extension in Home Economics, foods, sanitation, household management. Extension in Home Economics, nutrition (for those eligible), household management. Extension in Home Economics, foods (lectures), nutrition (lectures). Extension in Home Economics, sewing, foods (lectures). Extension in Home Economics, sewing, household management. Extension in Home Economics, sewing, nutrition (lectures).

Information regarding courses in Home Economics may be had by addressing the Department of Home Economics.

F. **Sewing.** Credit, two hours. Laboratory daily except S, 9–12 or 2–5. Home Economics Building 300. Miss BLACKMORE.

A course designed for those who are to teach in the public schools. It includes a study of the economic standards for the production and selection of

clothing; hygiene of clothing; principles of art in relation to dress; instruction in drafting, cutting, and plain and machine sewing. Laboratory fee, $2.

H. **Home Economics in the Rural Schools.** Credit, two hours. Lectures, T Th, 8. Home Economics 245. Laboratory practice, M W F, 2–5. Home Economics 200.

A course planned to give teachers in the rural schools material on which to base practical Home Economics instruction. A few of the essential phases of cooking, sewing and sanitation will be studied with reference to their use in the schools of the village or open country.

LANDSCAPE ART

C. **The Arrangement of Home and School Grounds.** Credit, one hour. Lecture, Th, 9. Laboratory, W F, 2–4.30. Landscape Art Building. Assistant Professor CURTIS.

An introductory course consisting of illustrated lectures to explain some fundamental principles and of field trips to identify and explain the use of important landscape plants. The purpose of this course is to give the students a point of view in landscape work and in addition, to offer some specific suggestions for the solution of simple problems.

METEOROLOGY

A. **Meteorology and Climatology.** Credit, one hour. Lectures, M W, 11. Laboratory, T or Th, 2–4.30. Dairy Building. Mr. HAUSMAN.

This course is adapted to the needs of teachers of those subjects in which weather and climate are important factors, particularly physical geography and allied subjects. It is designed to acquaint the student with the general and secondary circulation of the atmosphere, and with the development, progression, and conditions that attend cyclones, tornadoes, hurricanes, and other special phenomena. The principles of meteorology are applied to practical weather forecasting by the aid of the telegraphic reports received through the United States Weather Bureau.

The laboratory practice consists of a systematic study of the principal weather and climatic elements, with the aid of maps, charts, and instruments. Attention is also given to the study of the progression of the seasons.

NATURE STUDY

A. **General Nature Study.** Credit, two hours. Lectures, M W F, 10. Field and laboratory observations, T Th, 10–12.30. Roberts Hall 302. Assistant Professors COMSTOCK and EMBODY.

The object of this course is to train teachers in making personal observations along several lines of nature study and to give them a foundation for carrying on the work independently. As many as possible of the laboratory periods will be spent in the fields in the study of birds, trees, and plants. Special attention will be given to observing the relation of insects to flowers of field and garden. The lectures will supplement the field and laboratory work, and will also present practical methods for conducting nature study in the grades, including plans for

breeding cages and aquaria; and one lecture will be given each week on nature literature.

B. **Natural History of the Farm.** Credit, one hour. Lectures, M, 8. Roberts Hall 292. Field work, sec. A, T Th, 2–5; sec. B, W F, 2–5. Assistant Professor EMBODY.

This is primarily a field course, treating of the wild inhabitants of the fields, woods, marshes, and streams of the farm. Wild organisms will be compared with domesticated ones, and the availability of certain wild forms for cultivation will be pointed out.

The following topics, among others, will be studied: wild fruits, wild roots, wild cereals, deciduous trees, evergreens, pasture plants and their fitness for pasture conditions, wild birds, wild mammals, and fishes and other inhabitants of the farm stream.

Each student will be required to do a considerable part of the work individually. Field reports must be handed in weekly and these will be carefully graded. Laboratory fee, $1.

H. **Seminar in Kindergarten Methods in Nature Study.** M, 2. Roberts Hall 402.

Intended primarily for those taking course A above. A conference on methods of presenting nature study materials to small children. Assistant Professor COMSTOCK.

PLANT BREEDING

A. **Principles and Practice of Plant Improvement.** Credit, one hour. Lectures, T Th, 9. Laboratory and field practice, T, 2–4.30. Forestry Building 210. Assistant Professor BARKER.

This is an elementary course designed primarily for teachers. The laws underlying plant breeding—variation, heredity, and general evolution—will be considered carefully. The course will be made as practical as possible and will give specific information for the teaching of plant breeding in elementary and high schools. Ample opportunity will be given for making hybrids, collecting specimens of variations in wild and cultivated plants, and similar exercises that have proved valuable and interesting to school children. Laboratory fee, 50 cents.

PLANT PATHOLOGY

A. **Plant Pathology.** Credit, three hours. Prerequisite: elementary botany, 5 or 6 hours. Recitations or lectures, M W F, 8. Laboratory, daily except S, 2–4.30. Auditorium, basement. Professor WHETZEL and Mr. CHUPP.

A fundamental course in plant pathology treating of the common diseases of cultivated plants, their nature, cause, and control. Laboratory fee, $4.50, plus a breakage deposit of $2.

B. **Identification of Mushrooms and Disease-inducing Fungi.** Credit, one hour. Lecture, T, 8. Laboratory, T Th, 9–12. Auditorium, basement. Professor WHETZEL.

Especially designed for teachers who desire a working knowledge of the common mushrooms and disease-inducing fungi that occur in this region. This work

will consist mainly of collecting trips for a part of the morning, followed by laboratory study and identification of the material collected. Teachers will find the facts and material thus collected of special service in nature study teaching and in the teaching of agriculture in high schools. Laboratory fee, $1.50, plus a breakage deposit of $2.

POMOLOGY

A. **General Fruit Growing.** Credit, three hours. Prerequisite: Botany 1, or its equivalent. Regular students who are planning to take additional work in pomology should not elect this course. Lectures, daily except S, 11. Recitations, T Th, 9. Roberts Hall 292. Laboratory, S, 8–10.30. Main Building 202. Professor C. S. WILSON and Mr. ROGERS.

A study of the methods of propagation and early care of commercial fruits, including the growing of seedlings, cuttings, and layers; principles of budding, grafting, pruning, and planting; soils, varieties, and planting plans for the orchard; cultivation, cover crops, fertilization, spraying, pruning, and thinning, as practiced in orchard management; picking, grading, packing, storing, and marketing of fruit. This course considers the apple, pear, quince, cherry, plum, apricot, and peach, and the nuts.

B. **Small Fruits.** Credit, one hour. Lectures, M W, 9. Recitations, F, 9. Roberts Hall 292. Mr. ROGERS.

A course considering the grape, raspberry, blackberry, dewberry, currant, gooseberry, and strawberry. The topics discussed are soils, varieties, propagation, planting, culture, picking, grading, packing, and marketing.

C. **Advanced Pomology.** Credit, one hour. Prerequisites: Botany 1 and Pomology A, or the equivalent. Lectures, T Th, 10. Roberts Hall 292. Laboratory, T, 2–4.30. Main Building 202. Mr. OVERHOLSER.

The course includes a comprehensive study of varieties; the judging of fruits; the preparation of planting and working plans; a study of the characters and botanical relationships of the fruits of the United States. Each student is required to collect and mount a number of varieties and species. A trip to Geneva will occupy one afternoon or a Saturday sometime during the course.

POULTRY HUSBANDRY

A. **The Care and Management of Poultry.** Credit, four hours. Lectures daily, 9. Poultry Building 375. Laboratory T Th F, 2–4.30. Poultry Building 300. Professors RICE and HALPIN and Mr. DANN.

Designed primarily for teachers of Agricultural High Schools and other secondary agricultural schools. The course consists of 36 lectures, and preliminary examinations, and 18 laboratory practice periods as they would be taught in one term of High School, and includes a general discussion and practical application of the principles of incubation; brooding; rearing; feeding; breeding for constitutional vigor, egg production; and fancy; marketing; housing; and general poultry farm management.

B. **Farm Poultry.** Credit, one hour. Lectures, M W, 10. Poultry Building 375. Laboratory Th, 2–4.30. Poultry Building 300. Professors RICE and HALPIN and Mr. CHARLES.

An abbreviated course dealing with the most important principles of Poultry Husbandry and their application on the farm.

C. **Feeding Practice.** Credit, one hour. Must be accompanied by course A or B. Practice three 30 minute periods per day, including Sunday, for six weeks; morning 7.30–8.15; noon 12.45–1.30; night 4.30–5.00. Poultry Buildings. Professor RICE and Mr. ANDREWS.

Practice in feeding for egg production and for fattening; includes preparation for market, record-keeping, and general care and management of fowls. Assigned reading and a written examination will be required.

D. **Incubating Practice.** Credit, one-half hour. Must be accompanied by course A or B. Practice three 30 minute periods per day, including Sunday for three weeks; morning 7.30–8.15; noon 12.45–1.30; night 4.30–5.00. Poultry Buildings. Professor RICE and Mr. BUCHAN.

Practice in operating incubators; disinfecting, keeping records, testing eggs and general management of the hatch. Assigned reading and a written examination will be required.

E. **Brooding Practice.** Credit, one-half hour. Must be accompanied by course A or B. Practice three 30 minute periods a day, including Sunday, for three weeks; mornings 7.30–8.15; noon 12.45–1.30; night 4.30–5.00. Poultry Buildings. Professor RICE and Mr. BUCHAN.

Practice in feeding, brooding, and caring for young chicks; keeping of temperature, food and growth records. Assigned reading and a written examination will be required.

RURAL ECONOMY

A. **Economic and Social Status of the Rural Community.** Credit, two hours. Prerequisites: for regular students, senior standing and Political Science 51; for Summer School students, the permission of the Department. Lectures and required reading, daily except S., 8. Soils Technology Building 143. Professor LAUMAN.

A fundamental, though brief, survey of the structure and functioning of the rural community with particular reference to American conditions.

B. **Marketing and Prices.** Credit, two hours. Prerequisites: for regular students, senior standing and Political Science 51; for Summer School students, the permission of the Department. Lectures, required reading and problems, daily except S, 11. Soils Technology Building 143. Professor LAUMAN.

A study of the factors involved in the marketing of products, particularly farm products, and the development and course of prices.

RURAL EDUCATION

B. **Agriculture in the High School.** Credit, three hours. Lectures and discussions, daily except S, 8. Soils Technology Building 282. Laboratory, T Th, 2–4.30. Professor WORKS.

A course for consideration of curricula, courses of study, school plot, home project, extension work and the preparation of material, as they relate to secondary school conditions. The work will be planned for those who have had technical preparation in agriculture. Lectures may be taken without laboratory work by special permission.

F. **The School.** Credit, two hours. Lectures and conferences, daily except S, 9. Rural Schoolhouse. Miss McCLOSKEY.

This course will suggest methods of instruction in elementary agriculture and nature-study, taking as a basis the work outlined in the New York State Syllabus for 1915–16. Simple apparatus to be used in teaching country-life subjects will be shown and discussed. Other subjects of lectures and discussions will be as follows: gardening in education; field work; natural history collections; neighborhood studies; the school and the home; recreation in country districts; dramatic entertainments; agricultural contests; the county fair; small school exhibits; additions to the school library; the school grounds; Arbor Day; Corn Day; and similar topics of interest to grade teachers, training-class teachers, district superintendents, and all persons interested in introducing country-life subjects into schools.

RURAL ENGINEERING

C. **Farm Mechanics.** Credit, two hours. Lectures, T Th, 12. Soils Technology Building 282. Laboratory, M W F, 2–4.30. Rural Engineering Building. Professor RILEY.

A study of the practical application of the simpler phases of mechanics to agriculture. Laboratory exercises will be given in knots and rope splicing, belt lacing, pumps, hydraulic rams, water supply systems, internal combustion engines, spray machinery, tillage implements, mowers, grain binders, and the mixing of concrete. Laboratory fee, $2.

SOIL TECHNOLOGY

C. **Soils.** Three periods. Credit, one hour. Lectures M W, 9. Laboratory and demonstrations. S, 8–10. Soils Technology Building 282. Assistant Professor BUCKMAN.

This course is not open to regular students in the college nor will students taking this course be permitted to apply it toward credit on any regular course of the department.

A practical, fundamental course in soils. The subject will be handled with special reference to the needs of those expecting to teach soils in secondary schools. The lectures will include a discussion of the formation and classification of soils, tilth, soil moisture, soil biology, soil amendments, manures and fertilizers, and practical soil management. The round-table once a week will give opportunity for questions and practical discussions as to methods of demonstration.

VEGETABLE GARDENING

A. **Vegetable Gardening.** Credit, one hour. Lectures, T F, 9. Laboratory, W, 2–4.30. Poultry 325. Mr. Work.

This course is designed primarily for teachers, and it is the purpose that the student shall require such a knowledge of vegetable plants and their management as will enable him to conduct school work advantageously. Laboratory fee, $1.50.

NOTE: Dr. C. D. Jarvis has been detailed by the United Bureau of Education to give special work in the New York State College of Agriculture in school gardening for teachers. This work will be offered during the summer of 1915. Detailed information may be secured upon application to G. A. Works, Ithaca, N. Y.

INDEX

OFFICIAL PUBLICATIONS OF CORNELL UNIVERSITY

Issued at Ithaca, New York, monthly from July to November inclusive, and semi-monthly from December to June inclusive.

[Entered as second-class matter, August 31, 1910, at the post office at Ithaca, New York, under the Act of July 16, 1894.]

These publications include

The Annual Register (for the year 1914–15, published January 15, 1915), price 50 cents.

Catalogue Number for 1913–14 (containing lists of officers and students), price 25 cents.

Book of Views, price 25 cents.

Directory of Faculty and Students, Second Term, 1914–15, price 10 cents, and the following informational publications, any one of which will be sent gratis and post-free on request. The date of the last edition of each publication is given after the title.

General Circular of Information for Prospective Students, January 1, 1915.

Announcement of the College of Arts and Sciences, May 1, 1914.

Announcement of Sibley College of Mechanical Engineering and the Mechanic Arts, February 1, 1915.

Announcement of the College of Civil Engineering, March 1, 1915.

Announcement of the College of Law, July 1, 1914.

Announcement of the College of Architecture, May 15, 1914.

Announcement of the New York State College of Agriculture, June 1, 1914.

Announcement of the Winter Courses in the College of Agriculture, June 15, 1914.

Announcement of the Department of Forestry, August 1, 1914.

Announcement of the Summer Term in Agriculture, April 15, 1914.

Announcement of the New York State Veterinary College, April 1, 1914.

Announcement of the Graduate School, February 15, 1915.

Announcement of the Summer Session, April 1, 1915.

Annual Report of the President, October 1, 1914.

Pamphlets on prizes, samples of entrance and scholarship examination papers, special departmental announcements, etc.

Announcement of the Medical College may be procured by writing to the Cornell University Medical College, Ithaca, N. Y.

Correspondence concerning the publications of the University should be addressed to

The Secretary of Cornell University,
Ithaca, New York